From: Rochlin, Kevin
Sent: Tuesday, May 27, 2014 1:44 PM
To: Douglas.Tanner; Greutert, Ed [USA]; Kelly Wright; Scott Miller; Stifelman, Marc; susanh@ida.net; Zavala, Bernie
Cc: Rochlin, Kevin; Williams, Jonathan
Subject: FW: Dust and Air Monitoring Plan example
Attachments: r13 Development Occupancy Plan.pdf; image001.jpg

Since FMC will shortly be submitting their Dust Control Plan, I wanted to send this out again as a reminder of what I expect to see from them.

Kevin

_____

From: Rochlin, Kevin
Sent: Monday, March 17, 2014 11:58 AM
To: Barbara Ritchie
Cc: Douglas.Tanner@deq.idaho.gov; Greutert, Ed [USA]; Kelly Wright; Scott Miller - Idaho DEQ (Scott.Miller@deq.idaho.gov); Stifelman, Marc; susanh@ida.net; Zavala, Bernie
Subject: Dust and Air Monitoring Plan example

Barbara,

Attached is the air monitoring plan and dust control plan used at the Asarco site redevelopment in Tacoma.

Kevin

_____

From:

Kevin Rochlin | Superfund Remedial Project Manager U.S. Environmental Protection Agency | Region 10 Office of Environmental Cleanup
1200 6th Avenue, Suite 900, ELC-111 | Seattle, WA 98101
(206) 553-2106
(206) 553-0124 (fax)
rochlin.kevin@epa.gov

image001.jpg

POINT RUSTON

DEVELOPMENT AND OCCUPANCY PLAN

Prepared For:

Point Ruston, LLC
Tacoma, WA 98407

Hydrometrics, Inc.
Consulting Scientists and Engineers

REVISED APRIL 2013

POINT RUSTON

DEVELOPMENT AND OCCUPANCY PLAN

Commencement Bay Nearshore/Tideflats Superfund Site
Operable Unit 02 - Tacoma Smelter Facility and Slag Peninsula
Operable Unit 06 – Marine Sediments and Groundwater
Ruston and Tacoma, Washington

Prepared for:

Point Ruston, LLC
5219 North Shirley Street, Suite 100
Ruston, WA 98407

Prepared by:

Hydrometrics, Inc.
3020 Bozeman Avenue
Helena, MT 59601

January 2012
Revised June 2012
Revised August 2012
Revised December 2012
Revised February 2013
Revised April 2013

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POINT RUSTON
DEVELOPMENT AND OCCUPANCY PLAN

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Operable Unit 06 – Marine Sediments and Groundwater
Ruston and Tacoma, Washington

1.0 INTRODUCTION

This Development and Occupancy Plan is submitted in compliance with Section 2.11 of the Final Statement of Work (SOW) for Remedial Design and Remedial Action as part of the Second Amendment to the Asarco Tacoma Smelter Consent Decree, part of the Commencement Bay Nearshore/Tideflats Superfund Site, Operable Unit 02 Asarco Tacoma Smelter Facility and Slag Peninsula and Operable Unit 06 Marine Sediments and Groundwater, Ruston and Tacoma, Washington (Consent Decree). This plan sets out to describe the health and safety controls required for each element of the Site Remedial Action (RA) that will be implemented to accommodate Point Ruston's plans for Phased development and occupancy of the Site, per the requirements of the Consent Decree, SOW and other governing documents applicable to the remedial action taking place at the Site.

The former ASARCO Tacoma Smelter site, for which Point Ruston, LLC is the owner and responsible party, as stipulated in the Second Amendment of the Consent Decree[1], is currently undergoing remedial action to redevelop the site. Point Ruston, LLC is completing the remedial action of the Point Ruston site (Point Ruston or Site) as part of a Superfund cleanup action, conducted under the jurisdiction of the United States Environmental

[1] Second Amendment to the Asarco Tacoma Smelter Consent Decree, part of the Commencement Bay Nearshore/Tideflats Superfund Site, Operable Unit 02 Asarco Tacoma Smelter Facility and Slag Peninsula and Operable Unit 06 Marine Sediments and Groundwater Ruston and Tacoma, Washington.

Protection Agency (EPA). Cleanup of the Site will incorporate a mixed-use development that includes residential, commercial, retail and public use. The conceptual plan for redevelopment of Point Ruston is shown on Figure 1-1. In order to economically and feasibly complete the remedial actions as required under the Consent Decree, the remediation of Point Ruston will occur in EPA approved phases. Phases consist of discrete geographic areas of the Site for which a specific construction management plan has been approved by EPA and adopted by Point Ruston, and for which completion results in that specific phase having met the required elements of the remedial action, including the Performance Standards under the applicable Record of Decision.

Point Ruston, LLC has prepared this Development and Occupancy Plan in compliance with Section 2.11 of the Final Statement of Work (SOW) as part of the ASARCO Tacoma Smelter Consent Decree and in accordance with EPA Operating Safety Guidelines (EPA, 1992) and other directives (EPA, 2010). The purpose of this plan is threefold:

1. Establish a plan for development of the Site in a manner consistent with EPA guidance and in a manner that is protective of workers and occupants.
2. Define controls and practices that when implemented will continue to protect occupants of the Site, whether permanent or temporal, from hazards associated with on-going remediation activities.
3. Prescribe controls and practices that will protect and maintain the completed portions of the permanent cap until remedial activity (RA) is complete.

Until the Permanent Cap is fully established, this Development and Occupancy Plan prescribes a number of measures to protect the health and safety of visitors, occupants and workers, which include installation and maintenance of Temporary Caps, zoning of the Site, controlling access to the Site, control of dust, monitoring of the site air and surfaces, and communications with Site occupants and regulatory agencies. The elements of the Development and Occupancy Plan will be employed during Remedial Action and development of the site in a manner that provides redundancy and ensures the health and safety of occupants and the general public as well as being protective of the environment.

Point Ruston

BUILDING USE LEGEND

1 A	CONDOMINIUMS OVER RETAIL / COMMERCIAL /OVER PARKING
1 B	TOWNHOMES
1 C	RESTAURANT
2 A & B	"COPPERLINE CONDOMINIUMS" OVER RETAIL / COMMERCIAL/ RESTAURANT / OVER PARKING
3 A	CONDOMINIUMS OVER RETAIL / COMMERCIAL / OVER PARKING
3 B	TOWNHOMES
4 A	CONDOMINIUMS OVER RETAIL / COMMERCIAL / OVER PARKING
4 B	LIVE-WORK TOWNHOMES
5	COMMERCIAL / OVER RETAIL
6 A & B	SENIOR HOUSING / ASSISTED LIVING MULT-IFAMILY / OVER PARKING
7 A & B	POINT RUSTON APARTMENTS / OVER PARKING
8	RETAIL / COMMERCIAL
9A	9-PLEX MOVIE THEATER OVER PARKING
9B	CONDOMINIUMS OVER RETAIL AND PARKING
10 A & B & C	RETAIL / COMMERCIAL
11 A	GROCERY MARKET AND 580 SPACE PARKING GARAGE
11 B	CONDOMINIUMS OVER RETAIL / COMMERCIAL
12	RETAIL / COMMERCIAL
13	PROMONTORY PARK: OPEN SPACE / RECREATION / DOG PARK
14 A	TOWNHOMES
14 B	PARKING GARAGE / COMMERCIAL / CONDOMINIUMS
15 A	CONDOMINIUMS
15 B & C	PARKING GARAGES
16	MEDICAL OFFICES ON WEST FACE / RETAIL / COMMERCIAL ON EAST FACE / OVER PARKING
17	FOUR-STAR HOTEL WITH RESTAURANT, LOUNGE AND MEETING ROOMS / OVER PARKING
18 A & B	RESTAURANTS / RETAIL
19	GRAND SALON SALES CENTER ABOARD HISTORIC FERRY

PARK FEATURES

- A DOG PARK
- B PLAYGROUND
- C OPEN SPACE / PICNIC
- D RESTROOMS
- E PATH TO YACHT CLUB RD.
- F SIDEWALK TO RUSTON WAY

Point Ruston

POINT RUSTON MASTER SITE PLAN

Point Ruston, LLC
5219 N SHIRLEY ST, STE 100, RUSTON WA 98407

DATE: 10/20/2011

SCALE: N.T.S.

REVISIONS:

EXHIBIT NUMBER:

2.0 PHASES OF REMEDIAL ACTION

Point Ruston is developing the Site as a residential mixed-use community and will complete the remaining Remedial Actions concurrently with development of the site. The remediation and development will be completed in EPA approved Phases. The Second Amendment to the Consent Decree describes a Phase as a portion of the Remedial Action to be performed in a discrete geographic area of the Site as approved by EPA pursuant to Paragraph 31 of the Asarco Tacoma Smelter Consent Decree and modified by Paragraph 17.J of the Second Amendment. Although there is an approved Site Remedial Action Plan (Hydrometrics, 2008) that describes "what" needs to be done in the way of RA, the remediation of each Phase will be governed by a specific Construction Management Plan (CMP) that explains "how" the RA will be implemented and how the site development and construction activities for each Phase will be implemented and coordinated with EPA in relation to the overall Site-wide remedy.

2.1 CONSTRUCTION MANAGEMENT PLAN (CMP)

Phase specific CMPs shall be utilized in conjunction with this Development and Occupancy Plan to guide Remedial Action for each Phase. While this plan establishes the controls and practices that will be used site-wide and lays out a coordinated approach for developing and occupying the site, each CMP will provide a detailed plan and design to be used in order to implement these controls and practices during that phase of development. Each CMP will include a site control map showing the zoning, fencing, access points, and air monitoring locations for that Phase of site development. In addition, each CMP will include specifications for dust control, storm water control, equipment decontamination, air monitoring, signage, and communication that are consistent with the requirements outlined in this plan.

2.2 PHASED APPROVAL OF REMEDIAL ACTION & OCCUPANCY

Upon the completion of the RA and development for a specific Phase, as prescribed under a CMP such a discrete physical area Point Ruston, LLC will seek EPA's approval and acceptance of the work on such Phase by submitting a request to EPA for a Certificate of

Completion. After a reasonable opportunity for review and inspection EPA shall determine whether the completed work has been performed in accordance with the RA standards and per the requirements of the Consent Decree, and if so, EPA will then issue a Certificate of Completion, thereby acknowledging the completion of RA on that Phase. Upon issuance of any Phases Certificate of Completion Point Ruston LLC then plans to allow occupancy of such EPA approved Phase. Completion of any single phase of RA is not automatically grounds for EPA approval and EPA's review of future CMPs and requests for future Certificates of Completion are to be considered within the context of a Phase's relationship to other adjacent work areas, and the potential hazards for future occupants. Therefore, one purpose of this Development and Occupancy Plan is to list the controls and practices that must be in place site-wide that are necessary for allowing this phased occupancy to occur.

2.3 TEMPORARY SITE CAP

Pursuant to Section 2.11 of the Statement of Work (SOW), an EPA approved temporary cap is required to be constructed prior to occupancy. The SOW requires a site-wide temporary cap consisting of a marker layer, clean soil and grass cover, or an alternate design approved by EPA. However, the temporary site cap requirement was changed to a 40 mil impermeable liner per EPA requirement provided in EPA's letter of March 24, 2011.

3.0 PERMANENT CAP

Remedial action has already occurred on some areas of the site and on other areas construction of the permanent cap has begun. As shown on Figure 1-1, these areas include:

1. The OCF
2. Shoreline armoring
3. Yacht Club Road
4. Ruston Way
5. Phase 1 CMP (completed concrete foundations) and
6. Stack Hill.

When each Phase of the Site Remedial Action is complete, a permanent cap will provide a remedy that addresses the site contamination problems, meeting the Performance Standards required for the Site. The permanent cap is designed to provide a physical and hydraulic barrier and a marker layer that separate human activity and surface water from the underlying contamination.

Three general types of cap structures are used to achieve the Performance Standards required for the Site remedy, including building structures, pavements, and a multi-layered soil cap. Building structures inherently provide a protective cap serving to separate underlying waste soils from human contact and to shed water from their footprint. Thus, the buildings planned for site development provide both a hydraulic barrier and a protective barrier to the portion of the site on which they sit. The RA plan for the Site (Hydrometrics, 2008) discusses cap structures in more detail. Buildings and sidewalks will be pressure-washed no less than annually. If the air quality standards listed in Appendix A are exceeded, EPA may direct Point Ruston to pressure-wash buildings or sidewalks more often than annually. Wash water will enter the storm water system where it is filtered for sediment removal.

4.0 ZONING

The Site will be zoned in order to ensure that ongoing construction activities will not create a health hazard for occupants of the property. Five zones will be used for the Site:

1. Exclusion Zone
2. Contaminant Reduction Zone
3. Clean Zone
4. Buffer Zone and
5. Occupied Zone.

As shown in the above list, zoning varies from the Exclusion Zone, in which only Hazwoper-trained personnel are allowed to work, to the Occupied Zone where access by the general public is allowed and may even include residential occupancy. In between these two extremes there will be Clean Zones that are maintained with a temporary cap, but where the general public is not allowed access and Buffer Zones that will ensure that the general public will not be in physical proximity to the Exclusion Zones. Contamination Reduction Zones allow workers and equipment to cross from clean areas to active work areas without spreading potential contamination.

4.1 EXCLUSION ZONES

Exclusion Zones are active remediation construction zones. Exclusion Zones will be:

- Separated from occupied areas by a buffer zone.
- Fenced.
- Enclosed with a wind fence in areas where contaminated soil is being excavated.
- Signed.
- Provided with a contamination reduction zone at each entrance.
- Maintained free of visible dust.
- Secured to prevent unauthorized entry when not occupied.

- Monitored for airborne dust that could present a health hazard to workers.
- Inspected.

Most Exclusion Zones will exist only for the time it takes to complete active remediation, which will mainly consist of excavation of waste soils, construction of building foundations, and installation of utility connections. Once the construction of the building foundation is complete and connected to utilities, a Clean Zone will then be established around the work area. Exclusion zones are dirty zones where access is limited to trained personnel only. Once a Clean zone is established around the building, less restrictive access may be warranted; however, untrained personnel may still be excluded from the clean zone.

The Cooling Pond Exclusion Zone, located on the west end of the site, is needed for the stockpile/disposal of contaminated waste soil. The cooling pond will be filled with waste soil; once brought up to grade, a temporary cap will be placed over this area. The cooling pond exclusion zone will be managed in the same fashion as other exclusion zones, with fencing, storm water runoff graded to a sediment trap, and a contamination reduction zone at the ingress/egress location. However, a buffer zone will not be constructed around this area.

4.1.1 Buffer Zone Separation

Buffer zones, which are described in detail in Section 4.4, will be used to separate exclusion zones from occupied areas for the purpose of keeping the general public from coming within the physical proximity of an Exclusion Zone. Therefore, Exclusion Zones will have a clean, fenced area, defined as a buffer zone, between them and any occupied zone.

4.1.2 Fencing

Exclusion Zones will be fenced around the entire perimeter, but the type of fencing can vary depending upon the activity and surroundings. Exclusion zone fencing will be maintained on a daily basis. If continual breach of site or security fencing is occurring, EPA may request revisions to the fencing plan.

4.1.2.1 Construction Fencing

At a minimum, Exclusion Zones need to have construction fencing for workers that marks the line between a clean work area and a work area requiring HAZWOPER protections.

4.1.2.2 Wind Fencing

During excavation of site waste soils, a temporary 10-foot high wind fence will be deployed on the perimeter of the excavation within an Exclusion Zone; however, a wind fence will not be installed at the ingress/egress location for truck and vehicle access. Design of the wind fence will be included in the Construction Management Plan covering the work to be performed, and will follow the design guidelines contained in Appendix B.

4.1.2.3 Security Fencing

Security Fencing will be installed between exclusion zones and occupied zones. Security Fencing will be a minimum of 6 feet high and constructed of chain link or an equal product. Although the security fencing will often be installed along the perimeter of occupied zones it may also be used around the perimeter of the Exclusion Zone itself, as long as there is a secondary fence installed to prevent the general population from entering the adjacent Buffer Zone.

4.1.3 Warning Sign

Warning signs (11” x 17”) will be securely attached to Exclusion Zone fencing in areas along haul roads, entrances, or other areas where workers or others are likely to be and spaced

every 50 feet. The truck and personnel entrances to each exclusion zone will have a warning sign mounted at eye level on both sides of the entrance.

4.1.4 Dust Suppression

A No Visible Dust standard exists for the entire site, which includes Exclusion Zones on the site. Dust Suppression will be accomplished in accordance with Section 6.1.

4.1.5 Security

When not being actively used, Exclusion Zones will be secured from entry by unauthorized personnel. Typically this will be accomplished with locked gates on the Security Fencing described in Section 4.1.2.3.

4.1.6 Drainage

Exclusion Zones must be well drained in order to ensure storm water from the exclusion zone areas does not contaminate adjacent clean areas. Construction Management Plans (CMP) for each individual phase of construction will provide specific details for site drainage issues such as grading, collection, conveyance, and discharge of storm water from exclusion zone, based on the BMPs presented in the Temporary Impermeable Cap and Site Wide Storm Water Construction Management Plan (Hydrometrics, 2013).

4.1.7 Air Monitoring

In accordance with the Construction Health and Safety Plan (Hydrometrics, 2012a), the Health and Safety Officer will periodically monitor the air quality of Exclusion Zones to ensure that workers are adequately protected. The measures used to ensure adequate protection, type of monitoring, frequency, and triggers to initiate monitoring are described in the Air Monitoring Plan, included as Appendix A.

4.1.8 Inspection

Exclusion zones will be proactively inspected on a daily basis and inspected weekly using the checklist in Appendix C.

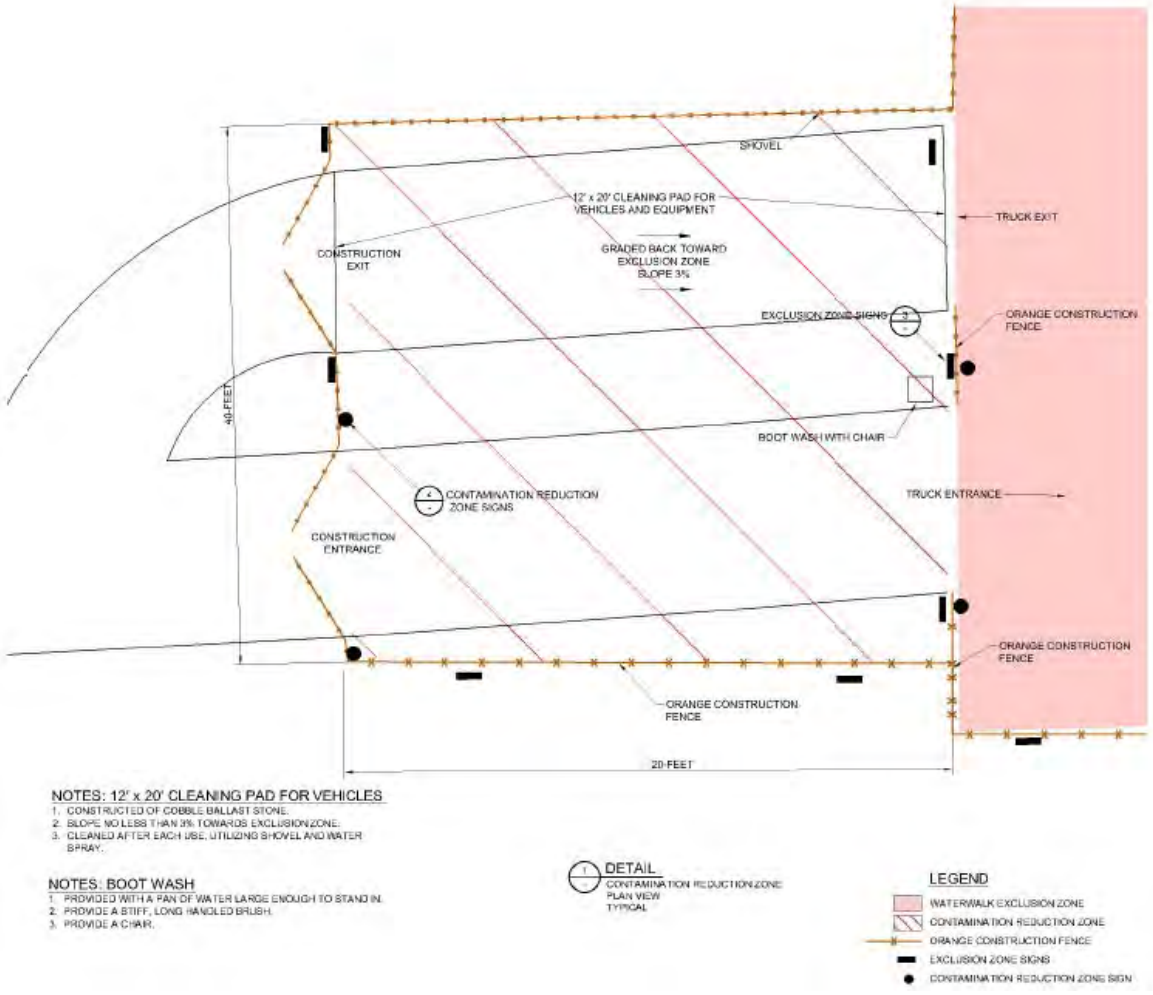
4.2 CONTAMINATION REDUCTION ZONES

Figure 4-1 depicts a plan of a typical CRZ. A Clean Haul Road will lead to the entrance of each Exclusion Zone. At the entrance to the Exclusion Zone and within its fencing, vehicles and personnel will enter an area marked as the Contamination Reduction Zone (CRZ), which will provide a surface of clean ballast rock, asphalt grindings, or other material that can be washed and kept clean. The pad must drain towards the exclusion zone with enough slope to prevent ponding over the pad during decontamination. The Contamination Reduction Zones will be:

- Equipped with a boot wash for personnel.
- Constructed with a wash pad for equipment and vehicles.
- Sloped to drain to towards the Exclusion Zone.

- Cleaned and Maintained.
- Fenced.
- Signed.
- Equipped with the necessary tools for decontamination of personnel and vehicles.
- Inspected regularly.

FIGURE 4-1. TYPICAL CRZ



4.2.1 Boot Wash

A boot wash will be provided as near to the exit of the zone as possible. The boot wash will include a container that will hold water while being easy to step into and the water will be frequently changed.

4.2.2 Vehicle/Equipment Wash Pad

A vehicle and equipment wash pad will be provided in the exit lane of the zone. All vehicles or pieces of equipment that have come in contact with exposed soils will exit the Exclusion Zone through the CRZ and be decontaminated. Decontamination is not complete until all dirt has been removed from the vehicle's exterior and interior surfaces, and the wash water used runs clear. At a minimum, decontamination will involve cleaning the cab interior with wet wipes (if necessary) and rinsing off the exterior of the vehicle, including its tires.

4.2.3 Drainage

The vehicle wash pad must be sloped sufficiently to allow the rinse water to drain away without pooling on the pad surface. The contamination reduction zone will be sloped to drain towards the exclusion zone in order to prevent cross contamination of the clean haul road leading to the entrance of the contamination reduction zone. However, water should not be allowed to pool near the exit of the exclusion zone where it can be picked up by tires entering the contamination reduction zone. Construction Management Plans (CMP) for each individual phase of construction will provide specific details for contamination reduction zone drainage.

4.2.4 Cleaning and Maintenance

The decontamination pad must be kept clean in order to allow vehicles and equipment to be washed without causing cross contamination. Therefore, the pad surface must be constructed of materials that allow the pad to be washed and kept clean, with no-visible soils at the pad surface. A surface of geomembrane or pavement will allow dirt to be rinsed off, while a surface of ballast-size rock will have voids large enough to allow dirt to be flushed through. A square-bladed shovel will be kept nearby to remove clods or deposits of dirt that are too large to be rinsed away. The boot wash container must be cleaned out and fresh water added daily.

4.2.5 Fencing

Construction Fencing will be used to delineate the zone and to clearly indicate where the zone ends and the exclusion zone begins.

4.2.6 Signs

A Contaminant Reduction Zone sign will be displayed at the exit of the zone, warning personnel that the area is clean beyond the fence and that they and their vehicle must be decontaminated before leaving.

4.2.7 Tools

The CRZ will contain a square-bladed shovel, a whisk broom, a boot brush, and a high pressure sprayer.

4.2.8 Inspection

Contaminant Reduction Zones will be inspected weekly using the checklist in Appendix C.

4.3 CLEAN ZONES

As the name implies, Clean Zones have a clean surface that is safe for workers to enter without wearing Hazwoper personal protective equipment. Clean Zones include work areas, haul roads, and other areas covered by a temporary cap of liner or gravel. These areas are open to non-Hazwoper-trained workers, but not to the general public. Areas open to the general public are classified as Occupied Areas. Areas of the site where RA is not occurring will be covered by a temporary impermeable cap of liner, and no entry onto the HDPE surface is allowed unless authorized personnel are inspecting the area. Clean zones will be established over work areas once foundations and utility connections are constructed. These will be constructed of a 6-inch layer of gravel. Clean haul roads will be constructed of either gravel or recycled asphalt pavement (RAP). Clean zones will be:

- Established around building sites following construction of foundations.
- Established in areas where RA is underway by construction of a Temporary Cap.
- Maintained clean and free of ruts or depressions that hold water.
- Constructed to ensure no runoff onto adjacent Temporary Cap areas.
- Routinely Inspected.

4.3.1 Building Sites

During excavation of foundations and trenching for utility connections, building sites will be controlled as Exclusion Zones. However, as soon as possible following the site development work, building sites will be graded to drain and provided with a temporary cap of 6 inches of clean gravel. If the temporary cap is to be constructed with less than 6 inches of gravel, a 6-oz/yd woven geotextile will be placed under the gravel. Areas of this temporary cap that may experience vehicle traffic will be a minimum of 6 inches thick. All areas will be sloped sufficiently to ensure no runoff onto adjacent HDPE temporary cap areas and have sufficient cover to prevent ponding above the surface of cap or additional gravel will be placed.

4.3.2 Temporary Impermeable Cap

As discussed in the Point Ruston Temporary Impermeable Cap and Site Wide Storm Water Construction Management Plan (Hydrometrics, 2013), a geomembrane will temporarily cap those areas of the site that are not already remediated and are not scheduled for remediation in the near future.

4.3.3 Maintenance

Clean Zone areas will be maintained with a smooth and even surface and with a clean cover of gravel. Maintenance of the temporary cap is discussed in the Point Ruston Temporary Impermeable Cap and Site Wide Storm Water Construction Management Plan (Hydrometrics, 2013). Haul roads and work areas will be tested for lead and arsenic at intersection, exits, and entrances where spillage might be most likely to occur and in any low spots where water has ponded. Additional gravel will be added to haul roads if levels exceed more than 100 ppm Arsenic and will be added to work areas if levels exceed more than 230 ppm Arsenic or 500 ppm Lead.

4.3.4 Drainage

Clean areas must be well drained in order to ensure that they do not become contaminated from storm water and to ensure storm water from the clean areas does not contaminate adjacent clean areas, such as haul roads and the temporary cap. Construction Management Plans (CMP) for each individual phase of construction will provide specific details for site

drainage issues such as grading, collection, conveyance, and discharge of storm water from Clean zones, based on the BMPs presented in the Point Ruston Temporary Impermeable Cap and Site Wide Storm Water Construction Management Plan (Hydrometrics, 2013).

4.3.5 Inspection

The Point Ruston Temporary Impermeable Cap and Site Wide Storm Water Construction Management Plan (Hydrometrics, 2013) addresses inspection of surfaces of clean areas and inspection of storm water controls. In addition to these inspections, clean haul roads and work areas will be tested for lead and arsenic on a monthly basis and the levels reported to EPA. A proactive inspection of all occupied areas will be conducted daily and a formal written inspection will be documented weekly.

4.4 BUFFER ZONES

Occupied zones will be separated from Exclusion Zones by a Buffer Zone. Buffer Zones will be:

- 50 feet wide, unless a narrower zone is approved by EPA.
- Covered by either a temporary or permanent cap.
- Designated by the Exclusion Zone fencing on one side and the security fencing on the occupied side.
- Signed in accordance with Section 5.3.

4.5 OCCUPIED ZONES

Occupied Zones of the Site are areas where a specific Phase of remedial action has been completed, a permanent cap has been installed, and a Certificate of Completion has been issued approving the completed remedial action and allowing the general public to occupy the area. Occupied Zones will be:

- Fenced to control access of the general public to only Occupied Zones.
- Signed in accordance with Section 5.3.

- Visually inspected for signs of dust that may be related to cross contamination.
- Closed to the general public if cross contamination is suspected (Section 8.4).
- Monitored for indications of air quality problems in accordance with Section 6.2.

5.0 SITE ACCESS CONTROLS

Site access will be carefully controlled to ensure that the zones, other than occupied zones, are only accessed by approved personnel with the appropriate training to keep them safe. Specifically, site access must ensure that only Hazwoper-trained workers come into contact with potential site contaminants. Site access controls will include fencing, access control points, and signage to delineate between areas of the Site that have been remediated and are accessible to the public and those that are not. The locations of fencing and site access will change as remedial action Phases become complete. The Construction Management Plan for each Phase will identify specific site access points and location of site access controls for each Phase.

5.1 FENCING

Fencing and signage will be maintained to control ingress to all restricted zones and areas. These zones include the exclusion zones and contamination reduction zones that are restricted to Hazwoper trained personnel, temporary cap areas and buffer zones that are restricted to inspection and maintenance personnel, and clean work areas and haul roads that are restricted to construction personnel. Access into any zone not intended for general public access will be limited to specific points of entry.

A 4-foot tall (minimum) security fence will be erected around the perimeter of all occupied zones on the Site. However, a 4-foot tall security fence is only adequate for those areas of an occupied zone adjacent to clean areas. Where there is an exclusion zone adjacent to an occupied area, a 6-foot tall security fence will be erected. When entry points are not manned, the gates will be locked or secured by call-in phone operation and at the end of a day's operations, the gate will be locked.

5.2 SITE SECURITY

Site superintendents, foreman, and management will continually monitor and enforce access protocols at the Site. The Construction Oversight Health and Safety Officer is directly charged with overseeing site security and his site security team will train all Site management to prohibit any individual who is not recognize or who do not produce appropriate identification from accessing any restricted Area. Personnel working in restricted areas will be issued identification badges indicating in which areas or zones they are authorized and for which they have the necessary safety training. The Construction Health and Safety Plan (Hydrometrics, 2012a) provides further details on the use of identification badges for the Site.

5.3 SIGNAGE

Figure 5-1 and Figure 5-2 show the signs used at the Site to indicate potential hazards to the public and mark the boundary fence of areas open to the public. Other signs, shown in Section 4, will be used to mark contaminant reduction zones and exclusion zones.

Signage will:

- Be displayed at 50-foot intervals along the edge of Occupied Zones on the fence in order to:
    - Give notice to the public to stay within the Occupied Zone.
    - Give notice to the public of the rules restricted access and hazards associated with the Site.
    - The No Access Sign (Figure 5-1) will alternate with the No Trespassing Sign (Figure 5-2).

- Be displayed at all entrances to Exclusion Zones to notify workers of the Hazwoper training requirements and identify the requirements of the Exclusion Zone, including:
    - Protective clothing is required.
    - No eating is allowed.
    - The Exclusion Zone Warning Sign is shown in Section 4.1.3
    - Drinking is restricted to closed containers.
    - Notice that the Exclusion Zones must be accessed through the Contamination Reduction Zone.
- Be displayed at exits from Contamination Reduction Zones to notify workers that decontamination is necessary before leaving the zone. The Contamination reduction zone sign is shown in Section 4.2.6.

FIGURE 5-1. TYPICAL BUFFER ZONE FENCE SIGNAGE – NO ACCESS

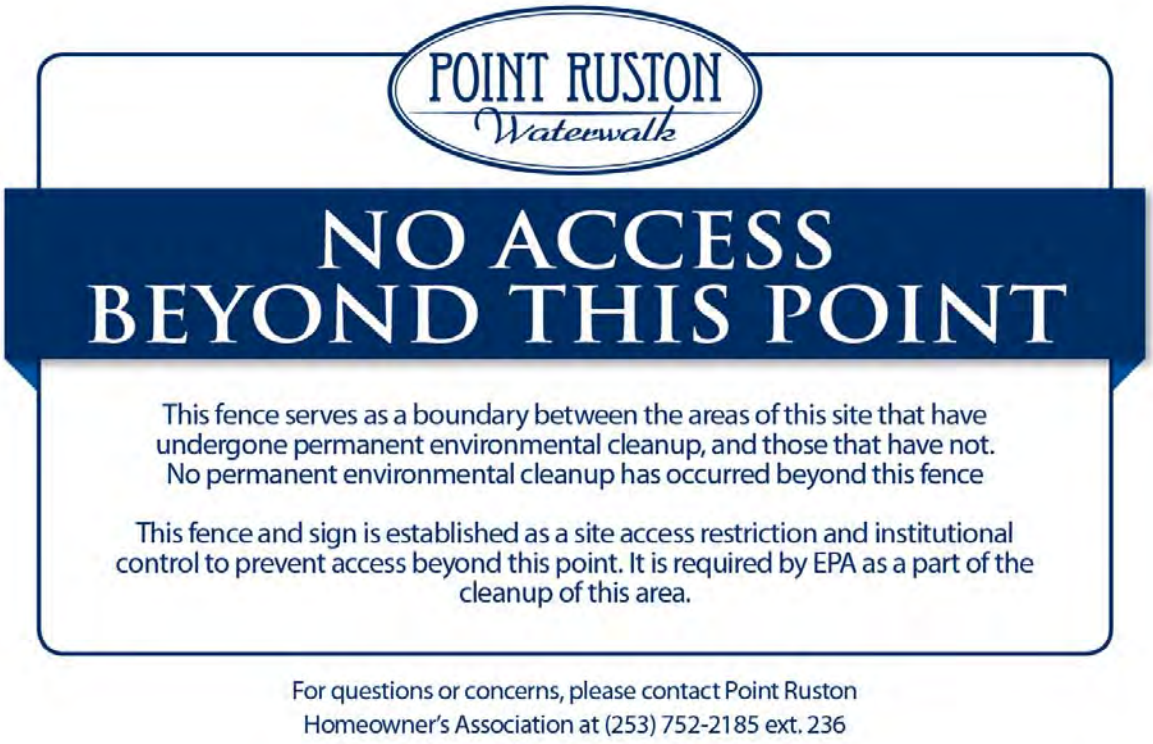


FIGURE 5-2. TYPICAL BUFFER ZONE FENCE SIGNAGE – NO TRESPASSING

6.0 DUST SUPPRESSION MEASURES AND AIR QUALITY

6.1 DUST SUPPRESSION

At all times, the Site is to be maintained to the no-visible-dust standard. Section 2.9.7 of the Statement of Work, Dust Control, states that:

> In order to minimize the potential for dust emissions to the extent practicable, Point Ruston shall wet key traffic areas and roads used for the remedial action; use dust suppression agents (wetting agents or polymer); decontaminate vehicles at designated truck washing stations prior to using off-site roads; cover trucks containing hazardous materials (e.g., stack bricks) and use dust suppression on off-site roadways, if necessary.

These dust Control measures will include:

- Hand-held spray at point of soil excavation or deposit as well as misting to provide general coverage of areas being excavated or graded.
- Watering of Clean Haul Roads and reduced vehicle speeds to ensure no visible dust.

- Misting or tackifying of exposed soils during periods of inactivity and tackifying or tarping of stockpiles.
- Monitoring of site surfaces over weekends and watering when necessary.

These measures will be re-evaluated if target levels under the Air Quality Monitoring Plan (Appendix A) are not obtained or if inspections of Occupied or Clean Zones suggest that dust control is not effective.

6.1.1 Dust Control During Soil Excavation and Hauling

Water will be used to prevent dust and ensure that no visible dust is generated. Water trucks will be used to keep roads and other areas open to vehicle access moist. Hand lines work well for point applications at the site of excavation and loading. Stationary spraying or misting systems are better suited for the times when personnel are not on site or for areas of the site where no active earthmoving is occurring. At the end of each workday all exposed soils in excavation areas will be sufficiently wetted to ensure the surface remains moist during non-work hours. The water application rate will be adjusted to provide enough water to control and prevent dust but not so much as to create runoff.

Appendix D includes a comprehensive dust control plan checklist that can be used to describe dust control methods for each Construction Management Plan (CMP) for each individual phase of construction. This dust control plan checklist provides options on how to control fugitive dust during soil handling, transport, and storage. An application of dust suppressant (soil tackifier) may be used for areas of the construction site where earth moving or disturbance is not occurring for a short duration (less than 6 months) and should be applied at the rate and frequency recommended by the manufacturer. The dust control plan checklist in Appendix D includes a section where dust suppressant information chosen for that construction phase can be described. In addition, the manufacturers' literature for Gorilla Snot® and Envirotac II (Rhino Snot) soil tackifier is provided in Appendix D, as these products have been used on the site in the past and are known to be effective. Larger dust control systems may be necessary or more effective for large excavations; therefore, general information on DustBoss and Rain Bird systems is included in Appendix D. Each

Construction Management Plan (CMP) will provide a dust control plan, design details, and specifications for an appropriate dust control system for each construction site.

6.1.2 Haul Roads

Water trucks will be used to apply water to unpaved haul roads and vehicle speeds will be kept low enough to prevent dust.

6.1.3 Exposed Soils and Stockpiles

The Cooling Pond is in use continually as an area for placement of waste soil excavation, and once placement of waste soils in the cooling pond is complete a temporary cap will be placed over this area. The cooling pond area will be managed in order to prevent fugitive dust while waste soil is being placed in this area. Dust from the Cooling Pond stockpile will be controlled by application of water when active hauling and placement is occurring or a dust suppressant (soil tackifier) when disturbance is not occurring. Appendix D includes the manufacturers' literature for Gorilla Snot® and Envirotac II (Rhino Snot) soil tackifier, as these products have been used on the site in the past and are known to be effective. Other areas of the site and stockpiles may also pose a dust hazard when soil is not covered or vegetated. Appendix D includes a comprehensive dust control plan checklist that can be used to describe dust control methods for each Construction Management Plan (CMP) for each individual phase of construction where soils will be exposed or temporarily stockpiled. Depending on location, additional air monitors may be required to monitor stockpiles, which will be specified in individual CMPs.

6.2 AIR QUALITY MONITORING PLAN

Air monitoring will be employed during remedial activities to ensure that airborne particulate is controlled at the source. As described in the Air Monitoring Plan contained in Appendix A, the existing air monitoring at the site perimeter will continue and will be augmented by air monitoring at the locations shown on Figure 2-1 in Appendix A. The location of these monitoring sites will be included in the construction management plan for each phase of RA.

6.2.1 Statement of Work

Section 2.9.6 of the SOW states:

> During remediation, Point Ruston shall ensure that no visible dust is present during excavation activities. In addition, Point Ruston shall evaluate potential emissions of contaminants into the ambient air as a result of implementation of the remaining remedial action tasks. All sampling and data gathering methods to be used must be described in detail, including sampling, frequency of testing, acceptance/rejection criteria, turn-around time, and plans for correcting problems. Hi-vol and PM_{10} air particulate or, if approved by EPA, portable air samplers consisting of battery powered pumps equipped with cellulose ester filter cassettes shall be placed at locations approved by EPA and used to confirm that the incremental levels identified in Table 2-2 are not exceeded. Air monitoring requirements will be discontinued once the permanent Smelter Site cap is in place; however, additional air monitoring may be required if the cap is damaged or if a portion of it needs to be removed for future construction or repairs. If approved by EPA, offsite air monitoring may be discontinued once the temporary cap is in place. However, onsite monitoring may be required to ensure development areas are not impacted by remediation.

6.2.2 Off-Site Perimeter Monitoring

The existing perimeter monitoring system will continue to be used for monitoring the air quality impacts that site work might have on off-site residents. The action levels for perimeter air monitoring are 1.5 $\mu g/m^3$ for lead and 0.4 $\mu g/m^3$ for arsenic, as described in Appendix A. Trigger levels are half of these amounts.

6.2.3 On-Site Monitoring and Sampling

Upon occupancy of the site, the action levels for on-site air monitoring will decrease to 0.15 $\mu g/m^3$ for lead and 4.1 ng/m^3 for arsenic, as described in Appendix A. Each Construction Management Plan will include a plan for air monitoring of arsenic and lead. This air monitoring will be done:

- Continually unless cessation is approved by EPA.
- Using a high-volume sampler or a real-time dust monitor.
- At any location required by EPA.

7.0 OPERATION MAINTENANCE AND MONITORING

Inspection of all components of the site systems and safeguards in place to protect the health and safety of site occupants and users must be conducted proactively on a daily basis. Formal documented inspections must be performed once weekly. Any maintenance that is performed shall be maintained by Point Ruston and at a minimum should document what repairs were made, the date, and who performed the repair. Emphasis will be placed on the operation, maintenance, and monitoring of the systems discussed in the plan, which include:

- Temporary Cap
- Fencing
- Signage
- Air Monitoring Equipment
- Stormwater Controls and
- Permanent Cap.

7.1 TEMPORARY CAP

The temporary site cap will need to maintain a physical barrier between site occupants and the Site's underlying waste soils and slag. Point Ruston will operate, maintain, and monitor the temporary cap in accordance with the Point Ruston Temporary Impermeable Cap and Site Wide Storm Water Construction Management Plan (Hydrometrics, 2013). Inspection forms for the Temporary Cap are included in the Point Ruston Temporary Impermeable Cap and Site Wide Storm Water Construction Management Plan (Hydrometrics, 2013).

7.2 FENCING AND SIGNAGE

Inspection of fencing and signage will continue to be included on Point Ruston, LLC's monthly reports to EPA. However, these items will be expanded to identify specific sections of fence and specific areas of signage as shown in Appendix C. Fencing will be maintained to ensure that a barrier to site access exists, and signage will be maintained to ensure that

appropriate warnings are posted and readable. Inspection forms for the Fencing and Signage are included in Appendix C.

7.3 AIR MONITORING EQUIPMENT

Operation and maintenance of air monitoring equipment is addressed in the Air Monitoring Plan contained in Appendix A. Inspections of the air monitoring equipment should be documented by the operator.

7.4 STORM WATER CONTROLS

Operation and maintenance of storm water controls is discussed in the Point Ruston Temporary Impermeable Cap and Site Wide Storm Water Construction Management Plan (Hydrometrics, 2013). Inspection forms for the Storm Water Controls are included in the Point Ruston Temporary Impermeable Cap and Site Wide Storm Water Construction Management Plan (Hydrometrics, 2013).

7.5 PERMANENT CAP

Operation, maintenance, and monitoring of the Permanent Cap is addressed in the Operation, Maintenance, and Monitoring Plan (OMMP) (Hydrometrics, 2012b), which has not yet been approved by EPA. Inspection forms for the Permanent Cap are included in the Point Ruston Operation, Maintenance, and Monitoring Plan (OMMP) (Hydrometrics, 2012b).

8.0 NOTIFICATION, COMMUNICATION AND REPORTING

8.1 NOTIFICATION REQUIREMENTS

Notice to Key Personnel, as listed below, shall be given upon the occurrence of the following Reportable Event:

- Visible Dust
- Breach of Perimeter Fence by Unauthorized Person
- Air Monitoring Exceedance
- Damage to temporary cap
- Damage to asphalt or concrete pavement or surface
- Spills
- Fires
- Real-time Air Monitoring Exceedances
- Complaints from Site Occupants or Users Job Site Injuries or Accidents and
- Events which trigger additional inspection and maintenance.

A log will be kept on-site to record all reportable events listed above.

8.2 KEY PERSONNEL

The following Key Personnel shall be contacted and notified within two hours upon the occurrence of a reportable event per the chapter above:

Point Ruston Home Owner's Association/Point Ruston, LLC
Attn: Loren Cohen
(Office) 253-752-2185, Ext. 236
(Mobile) 360-280-5058

Point Ruston, LLC
Attn: Loren Cohen
5219 N. Shirley Street, Suite 100
Ruston, WA 98407
loren@pointruston.com

Hydrometrics, Inc.
Attn: Michael Oelrich
(Office) 406-443-4150, Ext. 179
(Mobile) 406-431-6803

Hydrometrics, Inc.
Attn: Michael Oelrich
3020 Bozeman Avenue
Helena, MT 59601
moelrich@hydrometrics.com

When key personnel are notified of a problem by on-site workers, employees, contractors, or the general public, the key personnel shall notify EPA immediately (within 24 hours) of the incident by phone, email, or other such immediate form of communication and followed up in writing if EPA cannot be reached immediately.

8.3 COMMUNICATION

Communication is an essential part of protecting occupants from the site hazards. Point Ruston will communicate with site occupants and the general public in a variety of ways, including:

- Informational displays in all Occupied Zones.
- Informational displays and data in the Point Ruston Marketing Office and any future sales and leasing offices.
- Signage as described in Section 5.3.
- Direct notification of permanent occupants.

8.3.1 Informational Displays

All Occupied Zones will contain an informational display, similar to those in the Point Ruston Marketing Office that provide a brief history of the site, including its Superfund status, and provide a general description of the hazards associated with the remedial site actions and the areas that are off limits to the public. EPA will review and approve the information displays that are proposed, as well as, review and approve where the informational displays are to be located.

At a minimum, informational displays will provide a location for informational updates on:

- Air monitoring results for lead or arsenic.
- A change/closure to the areas open to the public.
- An EPA directive requiring public notification.

8.3.2 Direct Notification of Permanent Occupants

Point Ruston will notify individual occupants living or working on the site by phone, direct contact, or mail whenever there is a contingency action discussed below.

8.4 CONTINGENCY ACTIONS

Each CMP will provide a detailed Occupancy Plan, which shall be the plan and design used to implement the controls and practices required to safely occupy a given Phase of the Site during the development of that particular phase. As part of any Occupancy Plan, a set of contingency actions will be established in order to address the following situations:

1. Shelter in Place.
2. Short term Evacuation.
3. Long Term Evacuation.

Therefore, in advance of approval of the occupancy of any phase of the site the Occupancy Plan for such Phase shall be approved by EPA, and such plan shall include a set of contingency actions which address the aforementioned issues, as described below. A template of an Emergency Response Plan provided by the Federal Emergency Management Administration (FEMA) is included in Appendix E, which should be included in the Occupancy Plan of each CMP.

8.4.1 Shelter in Place

In the event that an air monitoring exceedance of a magnitude that presents a short term health hazard to occupants of the site occurs, EPA may determine that it is safer to remain indoors rather than evacuate. Point Ruston may also decide that it is safer to keep residents

indoors rather than evacuate, however, EPA's decision is controlling in the decision on whether to evacuate or not.. The standard for Shelter in Place contingency action will be set at ½ of the NIOSH 15 minute limit for arsenic (the NIOSH standard is 2 micrograms per cubic meter of air, 15 minute limit). Based on the correlation for TSP described in Appendix A (TSP = 3742.9 x 1/2 Arsenic NIOSH standard (1.0 ($\mu g/m^3$) + 6.32), the TSP action level, measured on the real-time air monitoring network, for Shelter in Place contingency actions will be 3750 $\mu g/m^3$.

The Emergency Action Plan Manager shall announce Shelter in Place status by public address system or other means of immediate notification available at Point Ruston. Shelter in Place contingency actions will be determined by Point Ruston or required by EPA and include:

- Contact EPA Immediately.
- Immediate construction shutdown.
- Immediate evacuation and closure of public spaces.
- Immediate notification of permanent residents with instructions to stay inside with door/windows closed and ventilation off.
- Immediate shut down of building ventilation systems.

Point Ruston Responsible Person(s) shall immediately notify all businesses and residents. If there are customers, clients, or visitors in the building, they shall be advised to stay in the building for their safety until authorities advise that it is safe to leave. Point Ruston Responsible Person(s) shall advise business owners and permanent residents to quickly lock exterior doors and close windows, air vents, and fireplace dampers. Responsible Person(s) familiar with the building's mechanical systems shall turn off, seal, or disable all fans, heating and air conditioning systems, and clothes dryers, especially those systems that automatically provide for exchange of inside air with outside air.

In addition, evaluation of the root cause of the air monitoring exceedance will commence immediately to determine proper mitigation of the problem. There may be a potential change in level of protection for construction workers, in order for the problem to be mitigated in a safe manor.

Shelter in Place contingency actions will be lifted and public spaces will be reopened upon evaluation of root cause and mitigation efforts and EPA approval.

8.4.2 Short Term Evacuation

The Short Term Evacuation contingency actions will be determined by Point Ruston or required by the EPA and:

- May be required prior to startup of site work after a Shelter in Place event.
- May be required for actions of known hazards (high concentrations, too close to building).
- May require immediate evacuation/shutdown of public spaces.

Short Term Evacuation contingency actions will be lifted and public spaces will be reopened upon EPA approval.

8.4.3 Long Term Evacuation

The Long Term Evacuation contingency actions will be determined by the EPA when there is a failure to continuously maintain the Site in a manner that is protective of public health and safety for occupants. Long Term Evacuation will:

- Require all building inhabitants to be evacuated.
- Public spaces and businesses to be shut down and evacuated.

Long Term Evacuation contingency actions will be lifted and businesses and public spaces will be reopened upon EPA approval. Site completion may be required by EPA prior to allowing people to re-occupy the Site.

9.0 DEVELOPMENT & OCCUPANCY

9.1 COMPLETED REMEDIATION

Remedial action has been completed on portions of the site that include Stack Hill, the On-site Containment Facility (OCF), shoreline armoring, Ruston Way, a portion of Yacht Club Road, Baltimore Street, 52nd Street. In addition, remedial action is underway on Phase 1 of RA and the Waterwalk. Therefore, over half of the site will have completed remediation prior to first occupancy.

9.1.1 Stack Hill

Remediation of the top of Stack Hill has been completed to residential standards and does not require capping. EPA has approved occupancy of single-family homes constructed on Stack Hill. The steep slopes surrounding Stack Hill are covered by a good vegetated cover and considered to be a Clean Zone. However, the slopes are not an approved Occupied Zone and access to the slopes of Stack Hill from the Occupied Zone will be controlled by fencing and signage meeting the requirements of Sections 5.1 and 5.3.

9.1.2 Onsite Containment Facility (OCF)

An onsite containment facility (OCF) has been built on the Site, which contains approximately 240,000 cubic yards of material excavated from the source areas of the Site. A hazardous waste "RCRA" cap was constructed to prevent water infiltration into the OCF and leachate collection and leak detection liners were constructed prior to disposal of the source soil. The OCF is operated, maintained, and monitored in accordance with its approved OMMP (Womack, 2007) and this will not be changed by occupancy of the Site. The OCF is a Clean Zone, but is not approved for occupancy. Access to the OCF from adjacent occupied areas of Ruston is controlled by a high fence, locked gate, and signage.

9.1.3 Shoreline Armoring

Shoreline armoring has been completed to protect the permanent site cap from erosion and damage.

9.1.4 Roadways and Associated Utilities

Public rights of way and underground public utility systems have been constructed. Remedial action components of this construction was completed in accordance with the Master Infrastructure Construction Management Plan (MICMP). This remedial action includes right-of-ways along Ruston Way, N. 51st Street, Baltimore Street, and Yacht Club Road and associated utility mains for storm water, water, and sanitary sewer. Although not part of the remedial action, this phase of construction also included installation of electrical power, natural gas, phone and cable systems, which were coordinated with the remedial action. The portion of this MICMP construction within the City of Tacoma used source soil removal and clean fill methods to meet Site RA requirements and Performance Standards, while a multi-layer cap was constructed in the Town of Ruston portions of this MICMP construction. Fencing and signage have been installed along Site-side of Ruston Way in order to control access to the Site, in accordance with Sections 5.1 and 5.3 and it has been opened to the public. However, the road could be closed again if it was necessary based upon construction of an adjacent phase of Remedial Action.

9.2 PHASE 1

The 5-story, 173-unit apartment building known as the Copperline Apartments is being constructed as part of the amended Phase 1 CMP. Under the revised Phase 1 CMP, this phase will included two main structures. The first structure was originally proposed as a typical “5 over 3,” with 5-stories containing 99-for-sale condominiums built over a 3-story concrete parking deck. The second structure is proposed as 44 for-sale condominiums, with a slab on grade foundation, and parking available in the structured parking deck in the first structure. The parking deck of the first structure and the western half of the slab-on-grade foundation of the second structure have been completed. As amended, Phase 1 proposes to complete the first structure and the rest of the slab-on-grade for the second structure. Access to the Phase 1 area is controlled by a fence along Ruston Way, as well as signage meeting the requirements of Sections 5.1 and 5.3. Once remediation is complete and occupancy has occurred, access to Phase 1 will be along a completed asphalt roadway from Ruston Way, per the designs approved in the amended Phase 1 CMP.

9.3 WATERWALK

The construction of the Waterwalk will provide a 100-foot wide public use space along the Site shoreline and includes a multi-use path that connects the existing Tacoma shoreline multi-use path to the peninsula. The construction of the Waterwalk has been completed and will be opened in multiple stages. The first stage will consist of construction of the Waterwalk from Ruston Way to within 100 feet of the Phase I project boundary, while the second stage will continue the Waterwalk from this boundary to the Breakwater Peninsula. The RA component for the Waterwalk consists of a multilayer cap that terminates behind the shoreline armoring. Lateral spreaders have been installed behind the shoreline armoring to provide an outfall for stormwater generated from clean surfaces in future phases of RA.

9.4 FUTURE DEVELOPMENT PHASES

As construction progresses and development goals are achieved, Point Ruston will submit Construction Management Plans for future Phases of remedial action and development. As required by Section 2.1, each CMP will contain a Site control map for that Phase that shows the specific location and extents of the site controls discussed in this plan. As the requirements for each phase of remedial action and development is completed, Point Ruston, LLC will seek EPA's approval of the RA construction. When approval is granted, EPA will issue a Certificate of Completion for the approved Phase.

Phasing of the site, approval of subsequent phases, and approval for occupancy will be done in accordance with the Consent Decree and subsequent letters from EPA.

10.0 REFERENCES

Hydrometrics, Inc., 2008. Point Ruston Remediation Design, Grade and Cap Site, January 2008.

Hydrometrics, Inc., 2012a. Construction Health and Safety Plan, Revision 6, January 2012.

Hydrometrics, Inc., 2012b. Operation, Maintenance and Monitoring Plan for Point Ruston, January 2012.

Hydrometrics, Inc., 2013. Point Ruston Temporary Impermeable Cap and Site Wide Storm Water Construction Management Plan, February, 2013.

U.S. EPA, 1992. *Standard Operating Safety Guides*. EPA Office of Emergency and Remedial Responses. Hazardous Response Support Division.

U.S. EPA, 2010. June 7, 2010 Letter Re: Sequence of Development and Occupancy Plan, April 2010 to Gary Petersen, Point Ruston.

Womack, 2007. Operation, Maintenance and Monitoring Plan – Tacoma Smelter On-Site Containment Facility.

APPENDIX A

AIR QUALITY MONITORING PLAN

APPENDIX A

AIR QUALITY MONITORING PLAN FOR POINT RUSTON

Prepared for:

Point Ruston, LLC
5219 N. Shirley Street, Suite 100
Ruston, WA 98407

Prepared by:

Hydrometrics, Inc.
3020 Bozeman Avenue
Helena, MT 59601

Revised April 2013

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APPENDIX A

AIR QUALITY MONITORING PLAN FOR OCCUPANCY

1.0 INTRODUCTION

As part of the requirements for the Remedial Action (RA) at the former Asarco Tacoma Smelter Site (the Site), an Air Quality Monitoring Program is established. At this stage of the RA, the program will fulfill requirements to monitor emissions of arsenic both from the Site and on the Site to assess the adequacy of dust control programs and to trigger a work stoppage if dust control is inadequate. This program will also aid in the determination of the cause of any exceedances so that adjustments can be made to dust control programs and/or operations to prevent further exceedances.

1.1 REMEDIAL ACTION DESCRIPTION

The Remedial Actions occurring on Site include placement of temporary caps, construction of storm water controls, surface water sampling and monitoring, and construction of the Smelter Site Cap, the Slag Peninsula Cap, and Sediment Cap.

1.2 PURPOSE AND SCOPE - AIR QUALITY MONITORING PLAN

This plan is part of the Comprehensive Plans and Documents for the Remedial Action (RA) at the Site and defines air monitoring procedures and protocol for providing verification that dust control efforts are sufficient. Elements of this plan include:

- Baseline air quality monitoring
- On-site monitoring
- Off-site monitoring

- Sample collection methodology
- Laboratory analytical protocol and
- Air monitoring "trigger" levels and corrective actions.

This plan contains procedures necessary for compliance with ARARs listed in the ROD, the Consent Decree, and the SOW. In addition, it will seek compliance with direction received from EPA (EPA, 2010). ARARs that are applicable, relevant or appropriate to this plan are:

- Washington Industrial Safety & Health Agency (WISHA) hazardous waste, construction, and demolition regulations (WAC 296-843 and WAC 296-155).
- Occupational Safety and Health Administration (OSHA) hazardous waste, construction and demolition regulations (29 CFR 1910 and 1926).
- Puget Sound Air Pollution Control Agency (PSAPCA) regulations; Clean Air Act (CAA), 42 U.S.C. §§ 7409, 7601; National Ambient Air Quality Standards (NAAQS), 40 CFR Part 50; Washington State general regulations for air pollution sources, WAC 173-400, and ambient air quality standards for particulate matter, WAC 173-470.

2.0 PROJECT DESCRIPTION

Continual ambient air quality monitoring will be conducted while RA activities are being performed (including during non-work hours) to ensure that implementation of dust control measures are effective. The objectives of the program are:

- Ensure that air monitoring is carried out under appropriate QA/QC protocols.
- Development of an ambient air monitoring system for the site designed to monitor for contaminants of concern.
- Designation of a laboratory for air monitoring filter analysis capable of providing 48-hour turn-around for sample filter analysis when trigger levels are met.
- Establishment of appropriate "trigger" levels for ambient air concentrations of contaminants of concern. These "trigger" levels would necessitate responses that may include evaluation of work methods, work stoppage, etc.
- Ensure Remedial Action activities are carried out in a manner that protects human health and the environment.

2.1 EXISTING AIR QUALITY DATA

Through operations involving the demolition of structures and the movement of materials into the OCF, 1993 to 2004, Asarco had continuously operated an air monitoring network to measure airborne levels of arsenic and other contaminants of concern on a daily basis. The network was comprised of three Hi-Vol monitoring stations and two collocated PM_{10} monitoring stations (Table 2-1). A large air quality database before, during and after demolition was obtained.

Two air quality sample stations near the plant site, Tavern and Parking Lot, have been monitored since completion of 1987 demolition activities until the near completion of deposition of source area materials in the On-site Containment Facility in 2004. Information collected at these sites during the last several years on the plant property has helped establish air quality baseline concentrations for the metals of concern in the area as minimal. Since Point Ruston acquired ownership of the site, there have been several examples where Trigger Levels

were exceeded (see Table 2-2). In each case, arsenic was the primary indicator over lead of problems in dust control activities. Air monitoring has never detected a problem with Cadmium levels, and Asarco and the EPA agreed to stop monitoring this metal in September 1993. Similarly, PM_{10} monitoring was discontinued.

TABLE 2-1. MONITORING STATION LOCATIONS

Station Name	Address
Historical Monitoring Locations	
Tavern	No. 49th & Baltimore Streets
Parking Lot	No. 52nd & Bennett Streets
Orchard	Near end point of Orchard Street. North Tacoma above smelter complex.
Other Historical Locations	
Plant North	Near North fence line
SO_2 Plant	Vicinity of SO_2 Plant
Mussig	4752 No. Winnifred
Ruston	N. 46th & Orchard
Current Monitoring Locations	
OCF Vault	No. 51st & OCF Vault #1
OCF North	No. 54th and Bennett Streets
Ruston Way	4900 Block of Ruston Way

TABLE 2-2. HIGH VOLUME SAMPLE HIGH VALUES

DATE	STATION	ARSENIC	CADMIUM	LEAD
Trigger Level ⇒		0.2 μg/m^3	0.5 μg/m^3	0.75 μg/m^3
10/10/09	SOUTH GATE	0.81	N/A	0.51
8/14/10	SOUTH GATE	0.86	N/A	0.53
5/09/11	SOUTH GATE	0.11	N/A	<.05

The exposure of remedial action personnel has also been monitored regularly to ensure that they are not being exposed to health hazards. Since Point Ruston has taken ownership of the site, there have been no exceedances of the OSHA construction standard action levels for arsenic or lead (Table 2-3).

TABLE 2-3. REMEDIAL ACTION PERSONAL AIR MONITORING HIGH VALUES

DATE	STATION	ARSENIC	LEAD
Action Level ⇒		5.0 μg/m^3	30.0 μg/m^3
06/24/09	Exposure Evaluation	<0.008	6.0
01/22/10	LID Manhole	3.1	1.9

2.2 INSTALLATION OF AIR QUALITY MONITORING NETWORK

The Air Quality Monitoring Network will include both off-site and on-site air quality monitors as well as an on-site weather station.

2.2.1 Off Site

Air monitoring is being conducted at locations along the Site perimeter to determine potential off-site exposure from the Site. As shown in Figure 2-1, three points have been used as permanent sites for potential perimeter sampling during this phase of the RA. These points are known as OCF Vault, OCF NW, and South Gate. These three points have been used because they either replicate or are an alternative site to a historical site that is no longer available. The

POINT RUSTON, LLC. DEVELOPMENT AND OCCUPANCY PLAN AIR MONITORING PLAN	**AIR MONITORING LOCATION MAP**	FIGURE **2-1**

UPDATE TIME: 12:36 PM
G:\PROJECTS\1100105\DWG\1100105H042.DWG
Hydrometrics, Inc.
Consulting Scientists and Engineers

OCF Vault site is near the Parking Lot site. The OCF NW site is at the North edge of the OCF. The South Gate site is representative of the South end of the site and replaced the Orchard site, which is no longer available. However, the South Gate site is now being used as an on-site monitor and is discussed in more detail in Section 2.2.2. The other two air monitors (OCF Vault and OCF NW) for the site perimeter are much further from site activities than the South Gate monitor and occupied areas of the site. Thus while useful, the data from the two remaining off-site monitors is insufficient for predicting site air quality.

Samples from the off-site monitors is collected on a week-day basis. On weekends and holidays, the monitors will run, but the samples will not be collected until the morning of the first workday, typically Monday. Samples will be analyzed for total arsenic and lead, with a detection limit of 0.05 $\mu g/m^3$. A description of sample collection equipment, sampling frequency, and quality control is in Section 3.0. Operation and Maintenance Procedures are included in Attachment I.

2.2.2 On-Site

As shown on Figure 2-1, five locations are being monitored on-site. Two of the locations have a Hi-vol air monitor, two locations use a real-time air monitor, and one location includes a Hi-vol air monitor paired with a real-time air monitor. Samples will be collected on a week-day basis. On weekends and holidays, the air monitors will run, but the Hi-vol samples will not be collected until the morning of the first workday, typically Monday. Hi-vol samples will be analyzed for TSP, total arsenic and lead. A description of sample collection equipment, sampling frequency, and quality control is in Section 3.0. Operation and Maintenance Procedures are included in Attachment I.

2.3 RA PERSONNEL MONITORING

Portable air samplers will be placed on employees involved in RA activities in accordance with the Construction Health and Safety Plan (Hydrometrics, 2012). The portable air samplers consist of battery-powered pumps equipped with cellulose ester filter cassettes. Sampler operation will be in conformance with National Institute for Occupational Safety & Health (NIOSH) methodology for arsenic, lead, and/or particulate studies. The filter cassettes will

be removed at the end of the work day and submitted for total metal and/or gravimetric analysis. This sampling will be performed by or overseen by the HSCO who is trained in the calibration, set up of the air monitors, and managing the filter cassettes. The laboratory turn-around-time for personal air sampler monitoring results shall be 7 to 10 days.

2.4 AREA MONITORING

The Puget Sound Clean Air Agency (PSCAA) also does air monitoring in the area. Their *2010 Air Quality Data Summary* documents the operation of the following particulate monitoring sites in the area surrounding the Point Ruston site:

- Tacoma Tideflats, 2301 Alexander Ave, Tacoma - PM_{10} and $PM_{2.5}$
- South Hill, 9616 128th St E, Puyallup - PM_{10} and $PM_{2.5}$ and
- 7802 South L St, Tacoma - PM2.5.

The 2010 report only presents basic data for PM2.5 sampling activities. It does show, however, that the 7802 South L St, Tacoma site is in violation of the National Ambient Air Quality Standards (NAAQS) for PM2.5. The other two sites listed above have somewhat lower ambient PM2.5 levels, at about 2/3 of the NAAQS.

PSCAA has also operated PM_{10} samplers at two of the above locations for many years, and has generated a significant amount of historical data. In addition, ASARCO has also previously operated PM_{10} samplers on the site during past remediation efforts. Both of these data sets show annual average PM_{10} concentrations at approximately 20 $\mu g/m^3$, with the maximum measured value per year between 50 and 70 $\mu g/m^3$. For the Point Ruston Site, the EPA requires that that no visible dust is allowed on the site, and dust emissions standards were previously set at the site boundary.

2.5 BEST MANAGEMENT PRACTICES (BMP) FOR CONTROLLING DIESEL EMISSIONS

EPA recommends the following BMPs for controlling diesel emissions.

2.5.1 Idle Reduction

Long duration idling consumes over one billion gallons of fuel annually in the United States, at a cost of over $2.5 billion. Idling of trucks, alone, is estimated to emit 11 million tons of CO_2, 180,000 tons of nitrogen oxides (NO_x) and 5,000 tons of fine PM each year. A single hour of truck engine idling consumes approximately one gallon of fuel and emits approximately 20 pounds of CO_2. Idling also:

- Shortens engine service life
- Poses health and safety risks of vehicle and cab occupants in the event of emission leaks and
- Increases pollution and noise in nearly communities.

Idling often occurs during site cleanup when loading or unloading materials, operating auxiliary equipment, and cooling or heating the interior of a vehicle of cab. A "no idling" policy can be implemented through corporate policy and onsite signage that displays idling time requirements meeting or exceeding those of state or local agencies. Point Ruston currently recommends to their contractors that they adhere to a 10 minute idle policy.

2.5.2 Equipment Maintenance

Green remediation strategies rely on maximizing equipment efficiencies of many site activities. Often overlooked efficiencies in fuel conservation can be gained through proper use and maintenance of all vehicles and equipment.

Transporters and field workers should ensure proper inflation and maintenance of tires at all times. Rolling resistance, an indicator of a tire's fuel efficiency, differs from tire to tire. Under-inflated tires increase the rolling resistance of vehicles and, correspondingly, decrease their fuel economy. Tire pressure monitoring systems on new vehicles are not a substitute for proper tire maintenance.

Decisions regarding tire purchases are expected to soon become more informed. In March 2010, the U.S. Department of Transportation (DOT) established test procedures to be used by

tire manufacturers in a new consumer information program that generates comparative performance information for tire replacement. When fully implemented, the program will provide point-of sale and online information (including a rating system) on fuel efficiency, safety, and durability of passenger car tires.

EPA recommends instituting vehicle and equipment maintenance plans that assure:

- Engine tune-ups in accordance with manufacturer recommendations, including optimal frequency
- Absence of dirt or insects in the fuel tank or line
- Tight connections and well lubricated moving parts
- Periodic replacement of filters in air and fuel systems
- Use of the manufacturer's recommended grade of motor oil, which can impact fuel economy up to 2% and
- Effective operation of equipment ballast to keep wheels from slipping.

Project managers also need to plan period "housekeeping" of onsite fuel storage tanks to assure:

- Minimal contact between the fuel and water; every tank should be emptied periodically to remove any water from the tank bottom
- Sampling and testing of any standing water in tanks to determine existence of microbial populations; microbial organisms can degrade fuel (particularly biodiesel) and cause plugging in dispensers and vehicle fuel filters and
- Addition of biocides for both conventional and biodiesel fuels wherever biological growth in the fuel has been a problem; biocides used with diesel fuels work equally well with biodiesel.

3.0 SAMPLE COLLECTION METHODOLOGY

3.1 FIELD EQUIPMENT

Three types of air sampling apparatus will be used as part of Point Ruston's sample collection methodology. Equipment meeting the parameters of 40CFR Part 50 for high volume (Hi-Vol) particulate sampling will collect total solid particulate (TSP), which will be analyzed for arsenic and lead. A Laser Photometer will be set up to continuously measure and record real-time TSP. Finally, portable personnel air samplers, consisting of battery-powered pumps equipped with cellulose ester filter cassettes, will be operated in conformance with National Institute for Occupational Safety & Health (NIOSH) methodology for arsenic, lead, and/or particulate studies.

3.1.1 Off Site

Ambient air quality sampling at the two off-site locations will be accomplished using high volume (Hi-Vol) sampling apparatus located at each of the three chosen sites. These samplers will collect particulate, which will be analyzed for total arsenic and lead. To the extent feasible, air quality sampling equipment will be located in conformance with criteria established by EPA (40 CFR, Part 58, Appendix E, Table 5). Variation from these criteria will be discussed with EPA prior to the final location of the monitor. Major location criteria are:

- At least 65 feet from trees
- At least 16 feet from the edge of a roadway
- 6 to 23 feet above ground level
- An unrestricted airflow 270 degrees around the sampler and
- Away from obstacles such as buildings so that the distance between the obstacle and the sampler is two times the height of the obstacle.

The air sampling system will operate within design parameters at least 23 hours per day on average. The equipment will be calibrated and operated within the design range of 39 - 60 cubic feet per minute sample rate. Calibration will be performed by or overseen by the HSCO at least once every three months. Sampler equipment will be operated by Point Ruston

personnel. They will change filter cassettes and provide for periodic calibration of the samplers.

3.1.2 On Site

On-site ambient air quality sampling will be accomplished using Hi-Vol monitors. These monitors will collect particulate, which will be analyzed for arsenic and lead. Ambient air dust levels will be monitored in real time using real-time TSP monitors. To the extent feasible, air quality sampling equipment will be located in conformance with criteria established by EPA (40 CFR, Part 58, Appendix E, Table 5). Variation from these criteria will be discussed with EPA prior to the final location of the monitor. Major location criteria are:

- At least 65 feet from trees
- At least 16 feet from the edge of a roadway
- 6 to 23 feet above ground level
- An unrestricted airflow 270 degrees around the sampler and
- Away from obstacles such as buildings so that the distance between the obstacle and the sampler is two times the height of the obstacle.

In addition, an on-site meteorological station will be installed on the Site, as shown on Figure 2-1. This station will monitor the following parameters:

- Wind direction
- Wind speed
- Temperature
- Relative humidity
- Barometric pressure and
- Precipitation.

The meteorological station will be connected to the real-time air monitor network to incorporate the data on the air monitoring network data logger, which will be connected to the internet (IP address pending).

3.2 FIELD OPERATING PROCEDURES

The following sections describe day-to-day operating procedures for Hi-Vol, real-time, and personal air monitoring equipment. Where procedures overlap, they are combined in one section.

3.2.1 Hi-Vol Samplers

Although historically, un-weighed filters have been used in the Hi-Vol units, a weighed filter will now be used in the paired installation so that the weight of total solid particulate can be measured and correlated to the data from the real-time monitor. This data may be used to determine a correlation between weight of total solid particulate and arsenic or lead levels for use in setting trigger levels for real-time monitors.

3.2.1.1 Filter Preparation

Filters presently being used are Gelman glass fiber, type A/E, 0.8 micron pore size. A filter is prepared for installation by removing one pre-weighed filter from the box and backlighting it to check for pinholes and imperfections before equilibrating it to its environment by placing it in the alternate filter holder, which is marked with the appropriate monitoring station name. The station name, date on which the filter is to be installed in the sampler, and filter number are entered on the envelope. The filter holder is then placed in the "sample saver" cover for that location. The date on which the filter is to be installed and the sample number are then entered in the field log. A filter is prepared for installation by weighing it to the nearest miligram and placing it in the filter cartridge (marked with the monitoring station name), which is then placed in the filter carrying case.

Precautions taken to prevent contamination of filter media are:

- Storage of filter materials, mailing envelopes and tweezers in an enclosed cabinet or single purpose room
- Filter handling will be on a clean, impervious surface (usually a table or desk specifically set up for the air monitoring task, with no contaminating activity in the area)

- Washing hands by service personnel prior to handling filters. New latex or plastic gloves should be worn by service personnel when handling filters
- Cleaning tweezers and filter cartridge covers prior to use. Only tweezers are allowed to touch filters and
- Cleaning of the carrying case and filter cartridges at least once per month.

3.2.1.2 Monitoring Station Procedures

Each day when the sample filter is changed, the in-use filter cartridge is removed and placed in the station's holder cover located in the field carrying case and immediately replaced by the alternate filter cartridge containing the new filter. The flow chart is removed and replaced with a new chart. The minutes of operation, date and time are recorded on the flow chart.

Upon return to the prep site, read the average flow of the air monitoring station from the recorder chart, record this information on the recorder chart as well as the envelope. Record start/stop time, counter time, minutes of operation on the recorder chart and the envelope. The exposed filter is removed from the filter cartridge, weighed, and placed in the mailing envelope. In order to minimize damage to the filter and/or loss of analyte, the filter should be folded in half and placed in another folded clean sheet of paper prior to being placed in the envelope. The envelope should then be delivered to the laboratory as described below in 3.2.4. Each envelope will be used only once for each filter sample.

Detailed procedures for operation and maintenance of equipment are provided in Attachment II.

3.2.1.3 Sample Handling and Transport

Samples will normally be collected for a minimum of 23 hours each day of the week. Air filter samples will be delivered weekly to the laboratory for analysis of arsenic and lead.

Air samples collected during the RA will be accompanied by a chain-of-custody record in accordance with procedures described in the RA Performance Standards Verification Plan. When transferring samples, the individuals relinquishing and receiving will sign, date and

note the time on the record. This record documents sample custody transfer from the sampler, often through another person, to the analyst at the laboratory.

The results of the metals analyses will be submitted by facsimile or email attachment from the laboratory to the Point Ruston site within 21 days of receiving the samples. Samples will typically be delivered to the laboratory on Mondays. Point Ruston LLC will report exceedances of the trigger levels as soon as possible to EPA's on-site representative and the EPA's project manager. Full results will be submitted in a report to EPA on a monthly basis.

Common carriers or mail service will be used to transport filters to the laboratory. If a local area Laboratory is used, filters may be hand delivered. Interruption of these services due to conditions outside of Point Ruston's control, such as adverse weather or holidays, will relieve Point Ruston of its responsibility to submit samples on Mondays. However, Point Ruston will deliver sampling as soon as reasonably possible under the adverse circumstances. Point Ruston will immediately notify the EPA of the conditions causing the delay, and document these conditions in the next monthly report.

3.2.1.4 Field Quality Control Samples

Field quality control samples will be submitted for Hi-Vol samplers and will consist of field blanks (unexposed filters) at a rate of 1 blank for every 20 samples or one per laboratory shipment, whichever is greater. There are no field quality control sample requirements for personal air samples.

3.2.1.5 Performance Requirements and Standards

Field performance requirements for Hi-Vol samplers include:

1. Calibration of each sampling system will be conducted at least once per quarter using a variable orifice unit. Date, time, and results of the calibration will be entered in the monitoring station log. Calibration will also be performed after replacement of brushes in the motor or other maintenance, which may affect operation of the motor or measurement devices.

2. Calibration of each sampling system will be conducted in accordance with procedures described in Attachment II for high volume monitors.
3. Flow checks of the high volume samplers will be conducted once per quarter in accordance with methods outlined in Attachment III regarding audit procedures.
4. The variable orifice unit used to conduct instrument calibration will be certified once per year by an independent standardizing laboratory.

3.2.2 Real-Time Air Monitors

Laser photometers will be used for real-time air monitoring of TSP dust concentrations. By itself this measurement is not particularly useful, but when correlated to the Hi-Vol results for arsenic, it will provide a real-time alarm when dust conditions on a work site are reaching levels of concern. The monitors are continuous, real-time 90^{o} light-scattering laser photometers that measure TSP. They have a short-term exposure limit (STEL) alarm feature for tracking 15-minute average mass concentrations and providing an alarm when setpoints have been reached.

3.2.2.1 Filter

Although not part of this plan, the real-time monitors do have a gravimetric sampling capability using a 37-mm filter cassette that can be inserted in-line with the aerosol stream, allowing gravimetric analysis and calibration.

3.2.2.2 Performance Requirements and Standards

Field performance requirements for real-time monitors include calibration of each monitoring unit will be conducted at least once per year. Date, time, and results of the calibration will be entered in the monitoring station log. Calibration will also be performed after repairs or other maintenance, which may affect operation of devices. If 37-mm filter cassettes are used for gravimetric analysis in the future, calibration will be performed according to the manufacturers' recommendations.

3.2.3 Personal Air Samplers

Point Ruston air quality will also be monitored using personal air quality samplers. Air samplers, worn by on-site workers, will monitor potential worst-case ambient air quality conditions, which is in the site workers' breathing zone. Results will be compared to OSHA/WISHA Permissible Exposure Limits, which are provided within the Site Health and Safety Plan.

3.2.3.1 Standard Operating Procedures

Standard operating procedures for Personal Air Samplers are described below:

1. Charge pump batteries overnight (10 hours). The recharger lamp filament is prone to breakage and the lamp must be lit to complete the recharging circuit. The pump will run eight to twelve hours on one battery charge. The sample pumps are equipped with out of flow range cutoffs, preserving valid samples despite battery failures, accidental plugging, etc.
2. Remove red plug and connect filter plastic cassette holder "spider web" base into tygon tubing (save plug).
3. Fasten air pump to employee with a belt or to the back pocket and clip filter on lapel near breathing zone (mouth and nose area).
4. Record filter cassette number, date, employee name, title, job description and pump number.
5. Remove inlet plug from the filter holder (save plug).
6. Turn pump on and adjust pump flow rate, using the calibrated rotameter or electronic readout. The setting on the pump should correspond as close as possible to 2 to 2.5 liters per minute. Record flow setting, and exact time (nearest minute) on sample submission form.
7. Let sampler run during the entire operation or for a minimum of seven hours during the work shift. Special circumstance tests may be run to report on air quality of specific tasks, for lesser periods of time.
8. Record the flow setting on the rotameter or electronic readout, turn pump off, and note exact time turned off. If the pump is not running at the end of the sample period, note

whether the flow indicator or low battery fault lamps are lit. Record the 'sample time' minutes from the pump, question the employee about activities or problems, and note comments in log. Contact the Health & Safety Compliance Officer to determine if the sample is valid.

9. Re-plug the filter cassette; fill out the work-up sheets and deliver filter cassettes and forms to the laboratory for analysis. Filters are mounted in cassettes by the manufacturer prior to shipment to the site for use. They remain within the cassette until analysis by the laboratory. In this way, field personnel do not come into direct contact with the filters.

3.2.3.2 Performance Requirements and Standards

Field performance requirements for Personal Air Sampler samples include calibration in accordance with procedures described in Attachment II. Precision rotameters or electronic flow meters integral to the monitoring pump will be calibrated on a monthly basis. Airflow on the pumps will be checked before and after each sampling event. Calibrating standard rotameters or bubble flow meters used in the monthly calibration of air monitoring pumps will be adjusted annually by an independent standardizing laboratory.

4.0 LABORATORY ANALYTICAL PROTOCOL

Upon receipt of the samples in the laboratory, the filters will be visually inspected and damage or abnormalities will be noted and reported. After the samples are logged in, they will be prepared for analysis. Table 4-1 lists the analytical methods, procedures, and detection limits for each parameter. ICP-MS is able to meet EPA's limits for the revised detection standard and will be the analytical method used for laboratory analysis.

Each sample will be assigned a unique laboratory identification number when received in the laboratory. Because of the inherent differences between personal air sampler filters and glass fiber stationary source filters, the digestion of each filter type will be addressed separately.

TABLE 4-1. ANALYTICAL METHODS, PROCEDURES AND DETECTION LIMITS

Analyte	Method	Procedure	Laboratory Turnaround Time	Report Turnaround Time	µg/filter	µg/m^3
					Minimum Reported Level	
TSP	Gravimetric	40 CFR 50 Appendix B			100	2
Arsenic	Furnace AA	EPA 206.2	4-6 days	4-6 days	6.0	.004
	ICP	EPA 200.7	3-5 days	3-5 days	60	.04
	XRF	EQL-0589-072	1 day	1 day	40	.03
	ICP-MS	EPA 200.8			2.0	0.001
Lead	Flame AA	EPA 239.1	4-6 days	4-6 days	120	.08
	ICP	EPA 200.7	3-5 days	3-5 days	60	.04
	XRF	EQL-0589-072	1 day	1 day	80	.05
	ICP-MS	EPA 200.8			2.0	0.001

1. High Volume Stationary-Source Filters

A ¾-inch by 8-inch strip is cut from the filter and is taken and placed into a labeled 150 ml beaker. Procedures used to prepare high volume filters (in accordance with Appendix G of 40 CFR 50) are then followed using the hot extraction method with 3 M HNO_3.

2. Personal Air Sampler Filter

The entire filter is placed into a labeled 125 ml flask. Eight milliliters of 85% HNO_3 - 15% $HCLO_4$ acid mixture are added to the flask. The sample is heated until dense white perchloric vapor fills the flask. The samples are cooled and brought to a final volume of 20 ml.

4.1 INTERNAL QC CHECKS

Quality control in laboratory analysis will be established through internal QC samples in accordance with Appendix B of the Performance Standards Verification Plan.

4.2 CONTROL CHARTS

The laboratory will utilize control charts to monitor long-term instrument performance and to identify "out-of-control" situations. Control charts are used to trigger corrective actions when control limits are exceeded. Specific control limits and control chart methodology are given in Appendix B of the Performance Standards Verification Plan.

5.0 AIR MONITORING, TRIGGER LEVELS AND CORRECTIVE ACTIONS

To address concerns about potential air quality impacts during site development activities, the on-site air monitoring system has been installed to measure particulate concentrations on the site. The locations of this equipment is shown in Figure 2-1. Three real-time dust monitors are part of this system in order to provide an immediate warning if site dust condition become a concern. Site meteorological data will be consulted in an attempt to locate the source of dust.

5.1 AIR MONITORING

The on-site air monitoring system is located much nearer on-site occupied structures in order to alert the construction management team when their work may be creating unsafe levels of dust. The real-time air monitors can be programmed to set an alarm at any pre-determined dust concentration level. Thus, when a real time dust concentration exceeds a pre-programmed threshold, on-site personnel will be alerted to the situation by personnel managing the dust monitoring communication network.

In addition to the real-time dust monitors, there will be Hi-vol monitors. These monitors collects samples on an 8” x 10” filter that will be analyzed lead and arsenic anytime a real-time monitor alarm suggest that exposure to high relatively high levels of arsenic or lead may have occurred. One of the Hi-vol monitors will be paired with a real-time monitor and will be analyzed for additional information about the particulate levels collected at the site. It will serve as a co-located QA check mechanism, producing 24-hour average data that can be compared to the real-time instrument output. Correlations between TSP and airborne metals concentrations will be analyzed and used to adjust the real-time dust trigger level. If a dust trigger level is exceeded and a real-time monitor alarms, the actual metals concentration for that day will be checked as quickly as possible (48 hours) to see if action levels for arsenic or lead were exceeded.

Point Ruston has a weather station outfitted with wind direction, wind speed, temperature, relative humidity, and precipitation instruments. This system will measure and electronically record these meteorological parameters continuously, and the system can be accessed remotely to allow data downloads and observation of real time met data. It is located near the center of the property, in a location judged to be free of nearby obstructions and representative of the site topography.

In addition to these monitoring activities, Point Ruston will continue operation of the two high-volume monitoring sites, located around the perimeter of the site. These sites currently collect metals concentration data as emissions from reclamation activities travel off-site. Thus, these sampling locations represent exposures to neighboring residential areas. It is also recommend that the filters the high volume samplers collect also be processed to determine total suspended particulate, in addition to the metals analysis. This data will allow comparison of on-site particulate levels, localized to remediation activities, with particulate levels near the border of the project site.

5.2 TRIGGER LEVELS

EPA has previously developed the current air monitoring standards and trigger levels that are being used to protect public health at Point Ruston during cleanup activities. These levels have acted as a guide for Point Ruston and EPA to assess what additional measures, if any, should be used to control sources of dust generated during the project. EPA has directed that new air quality standards be implemented prior to site occupancy, and Point Ruston is proposing the trigger levels discussed below in order to implement these standards.

Off-Site Trigger Levels		
Analyte	**Concentration ($\mu g/m^3$)**	**Detection Level ($\mu g/m^3$)**
Arsenic	0.2	.05
Lead	0.75	.05

On-Site Trigger Levels		
Analyte	**Concentration (ng/m^3)**	**Detection Level (ng/m^3)**
Arsenic	> 20 daily** > 4*	1
Lead	> 750 daily > 150*	1
	Concentration ($\mu g/m^3$)	**Detection Level ($\mu g/m^3$)**
TSP	> 80 daily**	1

* Rolling average over past 90 days. Weekly trigger levels will be adjusted based upon the previous 90 days of monitoring.

** Based on measurements taken to date. Values will be adjusted based upon results from continued monitoring.

5.2.1 Lead

Since the off-site action level was established, the National Air Quality Standard for lead has been revised downward and is now 0.15 $\mu g/m^3$ as a 3-month average concentration. However, the on-site action level for lead is 0.15 $\mu g/m^3$. This level will be monitored based upon a 90-day (3-month) rolling average.

5.2.2 Arsenic

Because there is no national standard for arsenic, EPA has based the on-site trigger level for arsenic on a 1 X 10^{-6} risk for a 10-year exposure scenario.

EC = (CA * ET * EF * ED)/AT

Where:

EC: exposure concentration, ug/m^3

CA: contaminant concentration in air, ug/m^3

ET: exposure time, hours/day

EF: exposure frequency, days/year

ED: exposure duration, years

AT: lifetime averaging time, hours

Risk = IUR * EC

Where:

Risk: cancer risk from inhalation pathway

IUR: Inhalation Unit Risk (from EPA IRIS database)

EC: exposure concentration (see above)

$1 \times 10^{-6} = 4.3 \times 10^{-3} * EC$

$EC = 1 \times 10^{-6} / 4.3 \times 10^{-3}$

EC = 0.23 ng/m^3

0.23 ng/m^3 = CA * 10 hrs/day * 350 days/yr * 10 years/AT

AT = 70 years * 365 days/year * 24 hrs/day = 613,200 hrs

CA = 0.23 ng/m^3 * 613,200 hrs/35,000 hrs

CA = 4.1 ng/m^3 =*Action Level for Arsenic*

As for the lead standard, this action level will be applied on site as a rolling 90-day average. Therefore, the trigger level is not a set value, but a value that will ensure that the average exposure over any 90-day period has been less than or equal to the action level shown above. Because EPA's on-site standard for As is below the historic detection limits, historic data

cannot be used to determine whether the air quality of the site has been meeting these new standards. However, starting in late May of 2012, Arsenic air levels at the South Gate Monitor were measured with enough precision to detect the on-site air quality standards. A rolling average for Arsenic is being monitored and used to determine a trigger level that will ensure that the action level of 4ng was not exceeded for the average air quality during the last 90 days. Since the end of July 2012, this trigger level has been above 20 ng, which EPA has determined will be the maximum allowable trigger level for Arsenic, regardless of the 90-day average. However, if air quality measured at the site repeatedly exceeds 4 ng/m^3, the 20 ng/m^3 trigger level for Arsenic will be adjusted downward.

5.2.3 Dust

Real-time dust monitors will be equipped to record TSP and to alarm when dust reaches a trigger level based upon the potential for arsenic exposure. The dust monitors continuously read and electronically record particulate concentrations. As shown in Attachment IV, Point Ruston determined an action level for dust by correlating TSP results with arsenic levels measured in the perimeter high-volume samplers. Based on this correlation (TSP = 3742.9 x (As trigger level) + 6.32), Point Ruston will use 81 $\mu g/m^3$ as a TSP trigger level for dust, based in the arsenic trigger level of 0.02 $\mu g/m^3$ described in Section 5.2.2. However, this level will be adjusted as necessary to ensure that it is triggered prior to exceedance of the action levels for either arsenic or lead.

A review of PM10 levels in the Tacoma area that were referenced against a historical TSP NAAQS, revealed a 24-hour maximum average of 260 $\mu g/m^3$ and an annual average of 75 $\mu g/m^3$. Therefore, the dust trigger level has been set at a level that is just above the annual average and well below the 24-hour maximum in the Tacoma area. Time will determine if this trigger level for dust is practical or whether background dust levels will continually trigger the monitoring alarms. The air monitoring data upon which the correlation of arsenic to TSP is based primarily reflects a site surface that was almost entirely covered in Ruston/North Tacoma soil that typically range in arsenic concentration from a few hundred to a few thousand milligrams per kilogram (mg/kg). When excavation goes below these

soils, concentrations of contaminants may be much higher as the excavation will be going through slag and other soils containing higher levels of metals. Therefore, prior to excavation of an area, the materials being excavated need to be considered. The contamination level in the excavated soil will be measured daily using a field XRF and based upon the level of Arsenic measured in the soil, the trigger level for dust may be adjusted. If the level of As contamination exceeds 10,000 mg/kg in the soils being excavated, the trigger level for dust will be reduced by one standard deviation, from 81$\mu g/m^3$ to 75$\mu g/m^3$.

5.3 CORRECTIVE ACTIONS

If the results of the Point Ruston monitoring network show one of the trigger levels have been exceeded at a location, Point Ruston will immediately check the instruments to ensure that there has not been a malfunction or that a trigger level has not been incorrectly set and if no errors are discovered will notify the EPA and its representative within 24-hours. Any earth moving work or other dust generating activities on site will stop until the cause of the trigger can be determined or until EPA acknowledges that the alarm was not likely to have been triggered by site activities. Point Ruston will determine, to the extent possible with available data, the on-site activity which was the apparent source of the exceedances. Point Ruston will verbally and in writing inform the EPA and its representative of the results of this evaluation within 48 hours of the alarm. Based on a combination of visual observations, monitoring data, and meteorological information, Point Ruston and the EPA will evaluate whether this on-site activity should or can be modified, delayed, or curtailed to prevent recurrence, or whether no additional action is necessary.

6.0 REFERENCES

EPA, 2010. Letter dated June 7, 2010 Re: Sequence of Development and Occupancy Plan, April 2010.

Hydrometrics, Inc., 2012. Remedial Action Comprehensive Plans and Documents, Volume II, Construction Health and Safety, Revision 6, Revised May 2012.

ATTACHMENT I

OPERATION AND MAINTENANCE PROCEDURES
HI-VOLUME SAMPLER (EPA, 1977)

OPERATION AND MAINTENANCE PROCEDURES
HI-VOLUME SAMPLER

Analyte: Particulates (TSP)

Procedures: Impaction

Range: 2-750 mg/m^3; 39-60 ft^3/min (1.1-1.7 m^3/min)

Manufacturers: General Metals, Sierra Instruments

This section is divided into general information about the high volume (Hi-Vol) sampler and operating procedures. The general information portion contains information on the normal operation of a Hi-Vol and some criteria for invalidating a sample. The operating procedures list the daily operations necessary to obtain a valid sample.

A. General

The sampler operates on 110 volts AC and requires approximately 5 amps (550 watts).

Under normal operating conditions with a clean filter in place the flow recorder must read in the range of 39-60 cfm or 1.1-1.7 m^3/mi n. (manufacturer criteria). In some instances, due to low operating voltage, worn motor parts, cracked tubing or motor housing, the reading may be somewhat lower. Low readings are to be questioned and the cause determined in order to avoid large errors in the measurement of the volume of air sampled. To properly cool the motor, a flow reading of 30 cfm or greater should be maintained. Therefore, the sampler should not be operated for an appreciable length of time at flow readings less than 30 cfm. Very seldom are the particulate levels high enough to cause the flow to drop below this reading. If the filter becomes wet during a severe storm, the motor may overheat sufficiently to damage it beyond repair. The standard shelter should provide adequate protection under all weather conditions.

The filter used for collecting the particulate matter is made of glass fibers smaller than one micron in diameter. In the manufacture of the filter paper a small amount of organic material is incorporated to act as a binder, thereby increasing the strength of the paper. Since the presence

of the organic binder is undesirable for air sampling, the paper is heated to a high temperature for a short time to remove the binder before the paper is cut into sheets. This explains the term "flash fired" commonly used in the description of the filters.

At those sites where the sample (filter) will be analyzed for other pollutants; e.g., metals such as lead (Pb), arsenic (As), cadmium (Cd), etc., the filters used will meet EPA's stated limits for trace elements. These limits may change annually so old filters or "off brands" may not be suitable for use at such sites.

While the filters are reasonably strong, they should be handled with a great deal of care. Extra precautions should be taken when removing the filter from the sampler. In this case, only the edges of the filter should be used for removing and folding the filter. Handling the filters with dirty fingers may contaminate the paper. To alleviate this potential problem, hands should be washed prior to handling filters. In addition, new latex or plastic gloves should be worn by service personnel handling filters. Do not use a damaged filter for the collection of a sample.

A pressure transducer is a box containing a bellows and a clock motor. A minicorder chart is connected to the transducer. A rubber tube connects the sampler to the transducer. When the sampler is on, the air pressure moves the bellows. The bellows is connected to a pen on the minicorder chart. As the chart moves around, the pen records the flow during the 24-hour period.

It is very important that complete data for each filter be properly filled out for each sample run. The following data will be recorded: sampler initials, filter number (this will agree with the number on the filter), name of station, date and exact time sampling was started and stopped. The only weather information to be recorded is that obtained by observation of existing weather by the operator of the sampler: rainfall, snow, smoggy conditions, high winds, and electrical storms. Unusual activity should be reported; for example: building next door burned down, tarring roof next door, dust storm, excavating in dry earth, agricultural burn, field work. The

"comments" space may be used for messages or pertinent remarks about sampling, sampler performance or problems. More information is better.

The filter (folded lengthwise inside a protective sheet) should be placed in the mailing envelope and mailed promptly. Only one filter is to be mailed in each envelope.

In normal operations the filter may adhere to the foam rubber gasket of the filter cartridge when the face plate is removed. When this occurs, the filter may be dislodged by gently jarring the face plate. The nuts on the filter cartridges should be tight, but by exercising caution against excessive tightening, the tendency of the filter to stick to the gasket will be minimized.

Invalid samples may be caused by problems such as:

1. Sampler failed during sampling.
2. Power interruption.
3. Air leakage around filter.
4. Filter installed crooked.
5. Filter torn or damaged.

If a sample is known to be invalid for a reason such as one of the above, explain in full on the data record sheet (Figure F-1) exactly what happened, giving dates and times as best you can. Then send in the sample, including flow readings. It may be possible to salvage the sample.

B. Operating Procedures

1. The sampler will be operated daily with the filters changed between 7:00 AM and 9:00 AM. Change out time may gradually shift between these hours to allow for use of daylight during filter changes.
2. Remove the roof of the shelter.
3. Unscrew, the four wing nuts securing the filter hold-down frame or filter paper cartridge until the bolts can be pushed back sufficiently to permit the removal of the frame or cartridge. If site is equipped with two cartridges, exchange them and perform steps 4 and 5

FIGURE F-1. DATA RECORD SHEET

Station	Filter Number	Date In	Counter Start	Time Start	Time Stop	Counter Start	Date Out	Comments

indoors or in a vehicle. If only one cartridge is available, it should still be reloaded (step 4-6) in a sheltered place (vehicle), then replaced on the Hi-Vol (step 6).

4. Gently remove the previously run sample (filter), if any, by sliding the data record sheet underneath the filter. Use the corner of the sheet to lift the edge of the filter. Center the filter on a protecting sheet of paper and fold carefully so that the fold is made lengthwise through the center of the filter. Place the sheet containing the filter in the mailing envelope provided.
5. Place a clean filter in position on the screen of the filter holder or cartridge. The filter side, which displays the number of the filter, should be facing down on the screen. If numbered on both sides, the rougher side should face up. Be sure the filter is centered on the screen so that when the filter hold-down frame is in position the gasket will make an airtight seal on the outer edges of the filter. Examination of the filter at the end of a sampling period will show if the filter was properly placed and sealed. The particulate sample should have a clean, sharp edge, not blurred or fuzzy.
6. Place the filter hold-down frame in position on the filter holder, being careful not to move the filter out of position. If using a cartridge, tighten the knurled nuts snugly enough to prevent the filter from sliding in the cartridge.
7. Move the bolts into place and tighten the wing nuts snugly and uniformly. If the wing nuts are too tight, too loose, or unevenly tightened, the gasket may lose its seal.
8. Close the roof of the shelter carefully to avoid damaging the filter.
9. Start the sampler by flipping the switch to the “on” position. For Hi-Vol samplers with pressure transducers:
    a. Make sure the flow meter tube is connected to the sampler. Allow Hi-Vol to run long enough to check motor and transducer operation.
    b. Tap transducer housing to insure that the pen has reached stabilization.
    c. Read the airflow directly from the minicorder chart. If the reading <u>does</u> <u>not</u> appear normal, troubleshoot. Make sure the pen has sufficient ink.

The volume of air that was drawn through the sampler during each run is determined by the readings taken from the rotameter or transducer chart. Thus, it is imperative that the rotameter or transducer be operating correctly and that the readings be taken correctly. The

operator, when performing the above checks, can readily tell if the flow measuring device is operating correctly and troubleshoot the problem. This will prevent the accumulation of large amounts of data that may later have to be invalidated because the flow readings were incorrect.

10. At the end of the sampling period again determine the airflow by following the procedures in Step 9. Record actions on the data record sheet.
11. It is very important that the data record sheet be properly filled out. Be sure the following information is recorded: sampler station or site name, filter number, date, time of sample start and stop, weather conditions and unusual activities that might increase or decrease the normal particulate level (for example, building construction next door, excavating in dry earth, high winds, deep or blowing snow).
12. Record sampling information on the matching pre-numbered envelope. Place the filter contained in the protective sheet in the envelope. Do not place anything inside the protective sheet containing the filter (e.g., Chain of Custody).
13. Mail the filter with other sample filters on the appropriate day.

C. Troubleshooting

The following is a partial list of possible solutions for problems normally encountered when operating Hi-Vol samplers.

Problems and possible solutions:

Unit does not come on.

1. Are power cords plugged in?
2. Is transformer burned out? Check bypassing transformer.
3. Is flow controller burned out?
4. Is timer wired properly? Or worn? Check by bypassing timer.
5. Disassemble motor and check brushes.

Unit comes on but flow trace is uneven or zero.

1. Check tubing for cracks, leaks, etc.
2. Check motor housing for cracks, leaks, etc.
3. Check transducer bellows for cracks, leaks, etc. This can be done with "Snoop."
4. Check transducer pen. Is it glued in place or loose?
5. NOTE: At some sites, daily line voltage fluctuations can cause an uneven trace.
6. Also heating or AC units kicking on and off can cause an uneven trace.

Trace is much higher (or lower) than previous runs.

Higher

1. Check if foam rubber gasket on filter hold-down frame is well sealed around filter.
2. If cartridge is being used, check if foam rubber gasket on the bottom of the cartridge is well sealed.
3. Is filter loaded properly or is it off center with an air leak along an edge?

Lower

1. Is tubing between motor and transducers cracked or being pinched when door is closed?
2. Have two filters been loaded?

High or Low

1. Are the same type of filters being used? Flow controller may be out of adjustment, especially those with size selective heads.

D. Maintenance

The high volume sampler is a relatively low maintenance device for sampling TSP, but some maintenance procedures must be followed to insure proper operation.

When an instrument is installed at a site, after a malfunction has occurred or after a pre-maintenance audit but prior to a routine calibration, the following checklist should be followed:

1. Check the shelter for physical damage.
2. Check timer for continuity.
3. Check rubber tubing to transducer; if it is cracked or broken, replace. Use tygon tubing in areas where fluorides may be present in the air.
4. Check motor case for cracks and replace, if necessary.
5. When removing the filter hold-down frame, check the gasket for cracks, looseness and resiliency. Replace or repair as necessary. Also check the gasket between the motor case and the filter holder.
6. After disconnecting the power, remove motor from case.
7. Check the motor cushion and replace as necessary.
8. Check wiring and connectors and make necessary repairs.
9. Remove brushes, check for brush length and abnormal, uneven wear. If the brushes are more than half used, replace with new brushes. If the brushes exhibit very uneven wear, replace motor because the armature bearings are badly worn and the motor will soon burn out.
10. Never put new brushes in a motor rated at less than 750 cfm.
11. Replace old type motors (<750 cfm) with new 750 cfm motors.
12. If the motor has burned out, replace motor with a new or reconditioned motor.
13. When installing a new motor, make the proper wire connections.
14. Replace motor case in Hi-Vol and recalibrate (see Section 2.1.1.2).
15. Check transducer pen cartridge. Replace if necessary. Glue in place with silicone sealant.
16. Check power cord to Hi-Vol. Repair or replace, if necessary.
17. Clean filter holder area of Hi-Vol as necessary with water. This will be done at least once a quarter or more often as conditions require.

18. Replace 90 v. step-down transformer as necessary. The voltage output from the transformer can be checked with a digital voltmeter if one is available.
19. Make a note of maintenance done on the data record card or calibration chart. Maintenance, which involves the installation of new parts, will be followed by a calibration.

References

Quality Assurance Handbook for Air Pollution Measurement Systems, Vol. II, EPA 600/4-77-027a, l977.

ATTACHMENT II

CALIBRATION PROCEDURES

(CFR Vol. 47, No. 234)

I. HI-VOLUME SAMPLER CALIBRATION

II. PERSONAL AIR SAMPLER CALIBRATION

ATTACHMENT II

I. HI-VOLUME SAMPLER AIR FLOW CALIBRATION PROCEDURES

I. HIGH VOLUME SAMPLER AIR FLOW CALIBRATION PROCEDURES

Analyte: Arsenic, Lead

Procedures: Calibration, secondary, resistance plates or variable

Range: 39-60 ft^3/min (1.1-1.7 m^3/min)

Manufacturers: General Metals, Sierra Instruments

A. General

Airflow calibration of a high volume sampler is carried out in two phases: 1) Calibration of a standard orifice, and 2) Calibration of the sampler using the orifice with resistance plates or a variable resistance orifice. Calibration of a standard orifice consists of comparing the pressure drop through the orifice with the actual airflow as measured with a primary airflow standard (rootsmeter). A calibration curve is then drawn for the pressure drop (inches of water) versus airflow. A calibration using the resistance method (plates or variable orifice) is then carried out in the field or laboratory using the above curve. Different resistances are used in the calibration to attain different airflows. The pressure drop along with the pressure transducer reading is recorded. The pressure drop is converted to flow from the orifice curve and is used in making the calibration curve for a given sampler (airflow versus pressure transducer reading). This calibration procedure deals only with calibration of the sampler using a previously constructed orifice curve. Orifice and run flows must be converted to SAC (standard atmospheric conditions: 760 mm, 25°C). The calculations necessary for this conversion are given in the Procedures and Comments portion of this section. The frequency of calibration will be at least once every three months and following maintenance or repairs. This schedule is necessary to ensure correct readings from the pressure transducer since both instruments' sensitivity can change over time. Calibration of the sampler will take place in the field. If the sampler is calibrated in the laboratory it is difficult to prevent jarring of the sampler during transportation and set-up, which could cause the calibration to be inaccurate due to misalignment or damage.

A single point check or pre-maintenance span near the operating flow rate of the previous calibration should be made prior to routine maintenance or adjustment. Recalibration is done after the maintenance or adjustments are completed.

The correction to SAC is partially considered in the orifice curve. In order for the flow to be converted to SAC, the average temperature and barometric pressure for the day of the actual sample run must be known. The average barometric pressure can be calculated from the elevation of the site. The final calculation of flow at SAC cannot be made until the sample run has been completed.

B. Procedures

These procedures are written for high volume samplers equipped with a pressure transducer.

1. Prior to recalibration or maintenance, a sampler in the field will have a one point accuracy check performed on it using the #18 plate, or if a variable orifice is used, a point near the normal run flow is chosen. Complete a control chart to measure performance accuracy.
2. Leave the filter holder on the motor and use an orifice adaptor plate with the standard orifice and a #18 resistance plate. If the high volume sampler has a flow controller, use a filter instead of the #18 Plate for the accuracy check.
3. Check tubing for cracks or leaks. Install a transducer chart on the recorder. Record the following information on the back of the chart: site, station name, date and initials of person performing pre-maintenance span and calibration. NOTE: The tubing used during the span or calibration must be the same tubing used for field measurements. Pressure transducer tubing should remain connected (run and calibration).
4. Connect one end of the manometer to the standard orifice, making sure that the free end of the manometer is open to the atmosphere.
5. Turn on the sampler and check that the pressure drop across the orifice does not exceed the range of the manufacturer. The 750 cfm motors now being used require an eight inch (8-inch) manometer. Allow the sampler to run for at least 5 minutes (15 minutes if

temperature is <O°F) for the unit to warm up and the flows to stabilize. If the sampler has not been previously calibrated, go to Step 8.

6. Observe and record the pressure drop (_p) reading on the manometer and transducer reading on the calibration record's Pre-maintenance Span section. Gently tap the side of the pressure transducer (PT) housing in order to achieve the correct pen deflection for a particular flow rate. Slowly rotate the PT chart to obtain a visible trace. The chart must be rotated slowly and the tapping maintained in order to prevent the pen from being deflected by the friction between the chart paper and the PT pen. Failure to do so will result in an incorrect value for the PT reading. Calculate the actual flow from the manometer reading and the recorded flow from the transducer calibration. Calculate the percent difference and plot it on the control chart.
7. Observe the temperature (°C) and barometric pressure (inches of Hg), if available, and record this information on the Calibration/Audit Field Worksheet (Figure F-2). Take this opportunity to fill out other necessary information on the calibration record. NOTE: Actual temperature is required, while the average uncorrected station barometric pressure (BP) can be calculated from the site elevation.
8. Turn off the sampler and zero the pressure transducer if necessary. This is necessary only if the deflection of the #18 plate or equivalent is >60 cfm or that of the #5 plate or equivalent is <20 cfm. Perform required maintenance. After gently tapping the transducer to ensure that the transducer reading is correct and has stabilized, carefully turn (while tapping) the transducer chart to obtain a trace for the zero point. If the high volume sampler is equipped with a flow controller, disconnect it and replace the filter with a resistance plate. Remove the filter holder from the motor casing, perform maintenance, and position the orifice in place for calibration.
9. Restart the high volume sampler with the #18 plate in place. Allow the sampler to run at least 2 minutes. After tapping the transducer to ensure that the transducer reading is correct and has stabilized, carefully turn (while tapping) the transducer chart to obtain a trace for the calibration point. Note and record the manometer and transducer readings on the calibration record in the columns and in the row corresponding to the plate #. If a

FIGURE F-2. CALIBRATION / SINGLE POINT AUDIT FIELD WORKSHEET

SITE _____ DATE _____ MOTOR No. _____ ORIFICE No. _____

( ) NEW MOTOR Barometric Pressure Temperature Done By:

( ) MAINTENANCE _____ Ambient _____ _____ _____

( ) AUDIT Average _____ _____

ORIFICE POINT 1 POINT 2 POINT 3 POINT 4 POINT 5 CORR

ORIFICE H2O	DICKSON CFM	ORIFICE H2O	DICKSON CFM	ORIFICE H2O	DICKSON CFM	ORIFICE H2O	DICKSON CFM	ORIFICE H2O	DICKSON CFM	ORIFICE H2O	DICKSON CFM	0.99 OR BETTER

variable orifice is used, the least resistance setting corresponds to plate #18 and the highest to #5.

10. Turn off the high volume sampler and replace the resistance plate with the next smaller plate; repeat Step 9 until the six plates have been used and the values have been recorded on the calibration record. If a variable orifice is used, the sampler need not be turned off between points, but five different resistance settings are still required. However, the two minute time period for flow stabilization must be observed between points for both methods.
11. Reconnect the filter holder to the motor casing and check to be sure there are no leaks. Reconnect the flow controller if applicable; run with one, then two filters in place to check that the controlled flow falls on the calibration slope, and that the controller maintains the set flow under heavy loading conditions (flow for both runs should be within 2%).
12. If the orifice calibration curve is not available at this time, the calibration procedure ends, otherwise continue.
13. The column marked Q1 must be completed. Q1 denotes the corrected flow rate read from the orifice unit calibration curve (see Figure F-3).
14. The Q1 column is completed by reading the numbers from the orifice calibration curve (m^3/min.), or calculated using the orifice regression equation $y = AX^B$ or $y = A/X + B$, where X = the manometer reading and A and B the coefficients to standard as listed in the orifice certification report.
15. Record the values on the calibration sheet.
16. Calculate a best fit line of the five points by linear regression. Record the equation and the correlation coefficient. NOTE: X = transducer reading; y=Q1; the correlation coefficient must be better than 0.990 to demonstrate linearity (calibrations with a correlation coefficient less than 0.990 are unacceptable and the sampler will be immediately recalibrated); and no point should deviate more than +0.02 m^3/min (+0.7 cfm) from the value calculated in the regression equation (slope should be between 0.02 and 0.04 for meters and 0.15 and 0.20 for feet).

FIGURE F-3. HIGH VOLUME SAMPLER CALIBRATION

STATION NAME _____

ORIFICE No. _____ NEW / REPAIRS?

DATE _____ _____

Calibrated by: _____ TEMP. _____ K

MOTOR No: _____ BARO PRESS _____" Hg

MANOMETER

LEFT	RIGHT	TOTAL	CFM DICKSON	Q_1

INSPECTION

TIMER	
TRANSFORMER	
SHELTER	
PLATFORM	
TRANSDUCER	
POWER CORD	

Q_1 = Flow (m3/min) from orifice curve

$Y = AX^B$ BEST FIT LINE: Y = _____ X + _____

A = _____ B = _____ correlation = _____

Description of maintenance performed:

C. Records

Accurate records of the calibration must be kept. The appropriate information must be supplied on the Hi-Volume field calibration sheet (Figure F-3). The sheet also serves as a record for maintenance work performed. The pressure transducer charts containing the record of the pre-maintenance span, calibration and flow controller operation check will be affixed to the calibration sheet.

The results of the calibration may be graphed on the back side of the calibration sheet or a linear regression table may be developed giving the transformations.

D. Airflow Calculation Referenced to SAC (Standard Atmospheric Conditions)

To determine the airflow at SAC (Qsac) for a given high volume sampler after a completed run, use the following procedure:

1. Determine Q1 (m^3/min) from the equation Q1 = S(PT) + i; where S = calibrated slope, PT = average pressure transducer reading; and i = calibrated intercept.

2. Calculate the flow at SAC (Qsac) using the following equation:

$$Qsac = Q1 \left(\frac{P3}{P2} \times \frac{T2}{T3}\right)^{1/2}$$

where:

P2 = Barometric pressure at SAC (760 mm or 29.92 inches)

T2 = Temperature at SAC (298° K)

P3 = Average barometric pressure for the site

T3 = Average temperature for the site during the time of the sample run.

NOTE: Barometric pressure may be in either millimeters or inches as long as both P2 and P3 are in the same units. Temperature must be in degrees Kelvin (°K).

$°K = 273 + °C \qquad °C = (5\,(°F - 32))/9$

The average barometric pressure may be used for one site. This can easily be determined from the appropriate meteorological tables or by using either of the following equations:

$P3 = 753.8 - (.02425)(E)$; where E = elevation of site in feet

Or

$P3 = P_{SL}\,(1 - 0.0226(Z))^{5.25}$

Where: Z = elevation in kilometers
P_{SL} = pressure at sea level (760 mm or 29.92" Hg)

A table of k values can be constructed for temperatures and pressures where:

$$k = \frac{P3}{P2} \times \frac{T2}{T3}^{1/2} = .392 \frac{P3}{T3}^{1/2}$$ (Pressure in mm)

Sample calculation:

Hi-Vol location = Missoula (3100 feet)
Average temperature for day of run = 10°C + 273 = 283°K
Q1 = 1.24 m^3/min (from the calibration curve)
Avg BP = 753.8 - (.02425 x 3100) = 678.63

$$k = \frac{678.6 \text{ mm}}{760 \text{ mm}} \times \frac{298°K}{283°K}^{1/2} = .392 \quad \frac{678.6}{283}^{1/2} = [.9400]^{1/2} = .9695$$

Flow rate for the sample run:

= (1.24) (.9695)

= 1.202 m^3/min at SAC (25°C, 760 mm)

ATTACHMENT II

II. PERSONAL AIR SAMPLER CALIBRATION

II. PERSONAL AIR SAMPLER CALIBRATION

1. Connect the pump, standard rotameter, and filter cassette in line. The filter and tubing used should be of the type normally used during field sampling.
2. Check the seals on Tygon tubing connections to assure the absence of leaks.
3. Charge the pump for ten hours prior to calibration.
4. Turn the pump on and adjust the flow to the desired setting. A five-point calibration is recommended over the operating range of the pump. For example, a suggested sequence would be 2.3, 2.2, 2.1, 2.0, 1.9.
5. Reset calibration of pump to match standard rotameter to near electronic readout, if necessary. See manufacturer technical guidance for instructions.
6. Run pump at setting, obtain reading from standard rotameter.
7. Repeat this procedure (6) for each of the desired pump settings (see instruction 4) and repeat for a total of six readouts at each flow setting.
9. Average each flow rate against the pump setting. Perform a linear regression calculation to obtain an equation of line for the calibration. The 'r' value for the line should exceed 0.99. Record the equation of line on the calibration record.
10. Enter the other relevant calibration data on the form (i.e., rotameter identification number, date, barometric pressure, temperature, and name of the calibrator).
11. Discard the filter used for calibration purposes as it should never be used in field sampling. Reset the pump flow to the setting optimal for field sampling and within the range calibrated - 1.5 to 2.5 L/min.
12. Record the calibration on the field record sheet for submission with sample filters to the laboratory.

ATTACHMENT III

AUDIT PROCEDURES

HIGH VOLUME SAMPLER AUDIT PROCEDURES

High Volume (Hi-Vol) samplers are audited by replacing the filter hold-down plate with a certified orifice attached to an adapter plate. Samplers equipped with flow controllers require a filter be placed under the sampling plate to duplicate the run flow pattern. One point near the operating flow rate should be adequate. Variable orifices used in audit/calibration will be certified annually by an independent laboratory.

A. Procedures

1. Hi-Vol
    - Secure the audit orifice and adapter plate in place of the filter plate. Include a clean filter if the Hi-Vol has a flow controller.
    - Open the manometer and connect it to the orifice with rubber tubing.
    - Turn on the Hi-Vol and wait a minimum of five minutes for equilibration.
    - Record barometric pressure, temperature, and wind speed on the appropriate audit form (Figure F-4, Hi-Vol).
    - Lightly tap transducer to attain a stable reading.
    - Record manometer and pressure transducer chart reading on appropriate form;
    - Close variable orifice slightly or change plates; repeat Steps E and F.
    - Turn off motor and return Hi-Vol to operating condition. Close manometer.
    - Record local or environmental factors that could affect samplings, as well as discrepancies noticed during audit in the comments section. These could include: worn gasket, cracked tubing, incorrectly set timer, torn or smudged filter, unsafe wiring, failure to meet siting criteria, road work, agricultural burning or plowing, loose filter hold-down plate, dirty interior, or physical damage to the equipment.

FIGURE F-4. HIGH VOLUME SAMPLER AUDIT

SITE _____ DATE _____

STATION _____ OPERATOR _____

AUDIT ORIFICE No. _____ CERT. DATE _____

BAROMETRIC PRESSURE _____ TEMPERATURE _____ K

	MANOMETER			Transducer	Reported	Calib	Audit	%
POINT	Left	Right	Total	Flow	Flow	Flow	Flow	DIFF
1								
2								
3								
4								
5								

T^{o} C = 5/9(^{o}F - 32) T^{o} K = ^{o}C + 273 Calibrated Flow = Reported Flow * CF

Audit Flow = Orifice Flow * CF

Correction Factor (CF) = $((29.92/BP) * (T\ K/298))^{0.5}$ = _____

Pressure Transducer reading for a normal run = _____

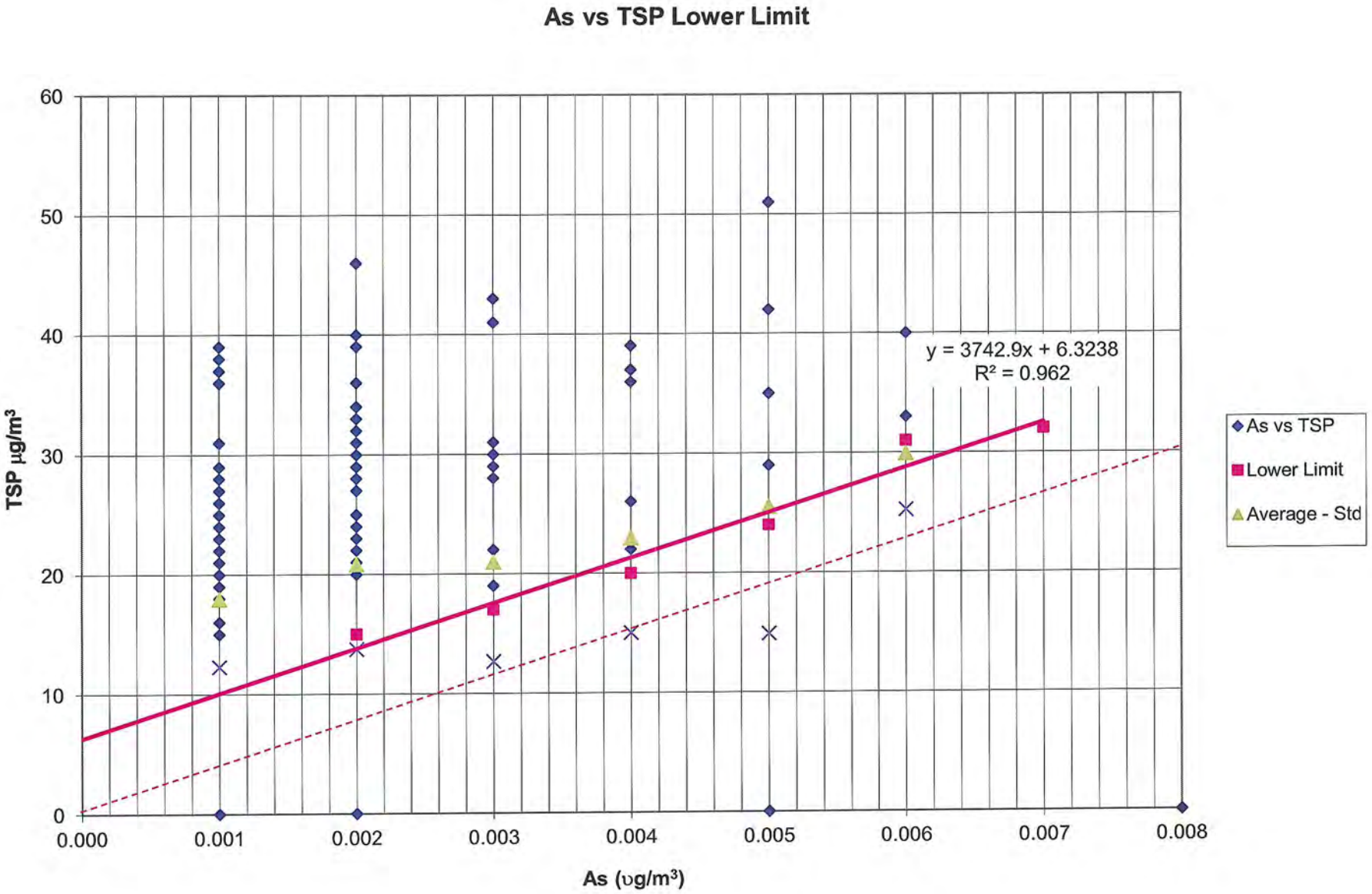
% = (Calibrated Flow - Audit Flow) / Audit Flow * 100 = _____

Audit Limits: Calibrated flow must be within +/- 7% of Audit Flow at point closest to usual run flow.

Comments:

ATTACHMENT IV

ARSENIC 90-DAY AVERAGE AND TRIGGER LEVEL



APPENDIX B

WIND FENCE DESIGN

WIND FENCE DESIGN

Many earth moving activities at the site may produce dust, but it may also be the result of wind erosion. When the soil is being excavated as part construction activities, water will be used at the point of earth moving to prevent dust from being produced. However, wind fence will be used around excavation sites as a backup to these dust control efforts and to reduce the potential for wind erosion to produce dust from the bare soil surfaces.

Dust is produced when loose surface material is picked up and transported by the wind, and surface soil is abraded by windborne particles. The wind speed required to pick up a soil particle is called the Shear Velocity[1]. For soils made up of a variety of particle sizes, which geotechnical engineers call the particle size distribution, Bagnold[2] introduced the concept of the "initial fluid threshold," which other investigators now call the Threshold Shear Velocity, U_T.

$U_t =$	$A\,[(\sigma-\rho)gd/\rho]^{1/2}$	Equation 7.10*

Bagnold found that wind erosion of soil will not occur until the wind speed is sufficient to move, not the smallest particles, but the predominant size of the particle size distribution. Bagnold also found that for particle sizes less than PM80, the required Shear Velocity actually begins to increase. In a well-graded soil, the particle size that should be used to determine erosion potential is a complex question. Bagnold suggested 2.8 times the square root of the mean diameter divided by .25mm, which was his standard grain diameter. Others have suggested similar complex methods. However, from geotechnical engineering we can borrow the concept of filter criteria, which states that the D_{85} of a soil determines the size of the voids between particles that control movement of smaller size particles down to about the D_{15}. Without getting caught up in a study to determine soil texture and chemistry, application of this principal of geotechnical engineering provides a convenient method of choosing the particle size to use in Equation 7.10. Therefore, based on data previously collected from site stockpiles of soil, I calculate that:

[1] British Geomorphological Research Group, "Soil Erosion," Edited by M. J. Kirkby and R. P. C. Morgan, John Wiley & Sons, 1980.

[2] Bagnold, R.A, "The Physics of Blown Sand and Desert Dunes," 1941.

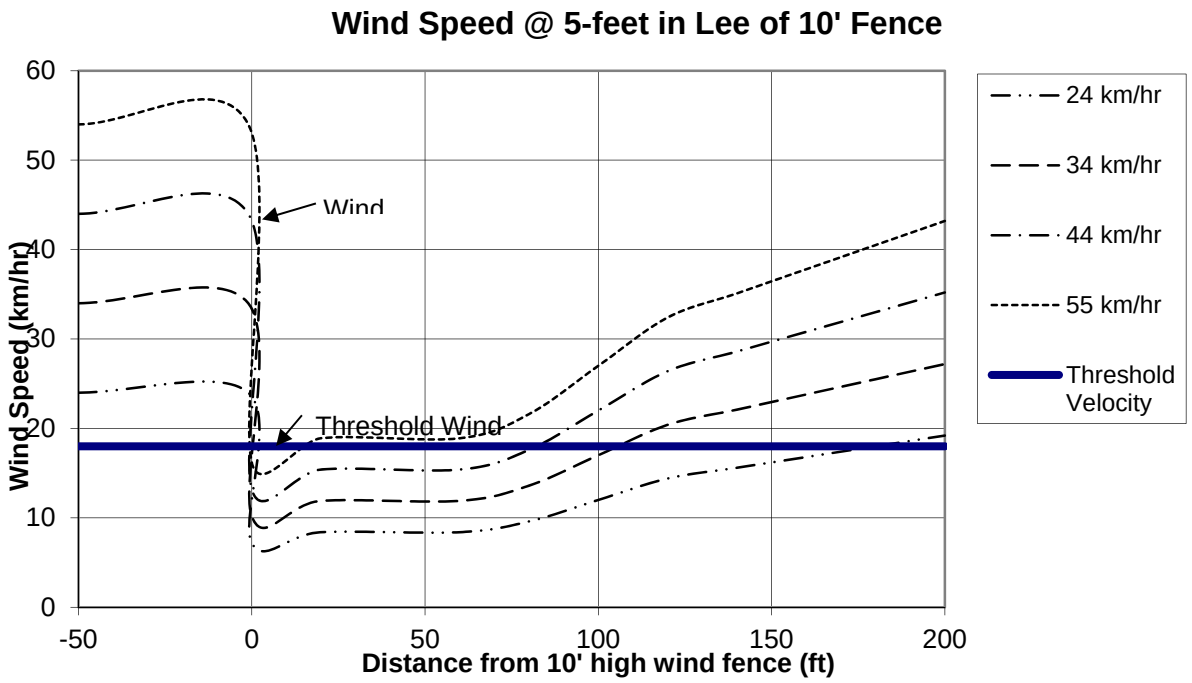
	A =	experimental coefficient		
	A <	0.1	for d>0.2mm	
	σ =	soil particle density		
	=	2.65 x 62.4	lb/ft^3	
	=	165.36	lb/ft^3	
	ρ =	air density		
	=	0.076	lb/ft^3	
	g =	gravitational constant		
	=	32.2	ft/sec^2	
	d =	diameter of soil particle**		
	=	0.25	mm	
	=	0.00082	feet	
U_t =	0.757878	ft/sec		
=	0.516735	mi/hr		

Investigators of wind erosion note that, because of the retardation effects of vegetation and other obstacles, wind speeds are lowest near the ground surface and increase with height[1]. Therefore, although a wind speed of 0.75 feet/sec may create dust from the bare surface of the site, the actual wind speed to be controlled by the wind fence is significantly higher. Therefore, I have calculated the wind equivalent wind speed at a height of 5 feet above the ground, which is at the mid-height of our fence. Note that his is still much lower than the standard height of 10 meters used for reporting wind speeds.

u_z =	velocity at any height z			
=	5.75 U log(z/z_1)		Equation 7.9*	
	z =	150	cm	
	z_1 =	0.025	cm	
=	16.46441	ft/sec		
=	18.11085	km/hr		

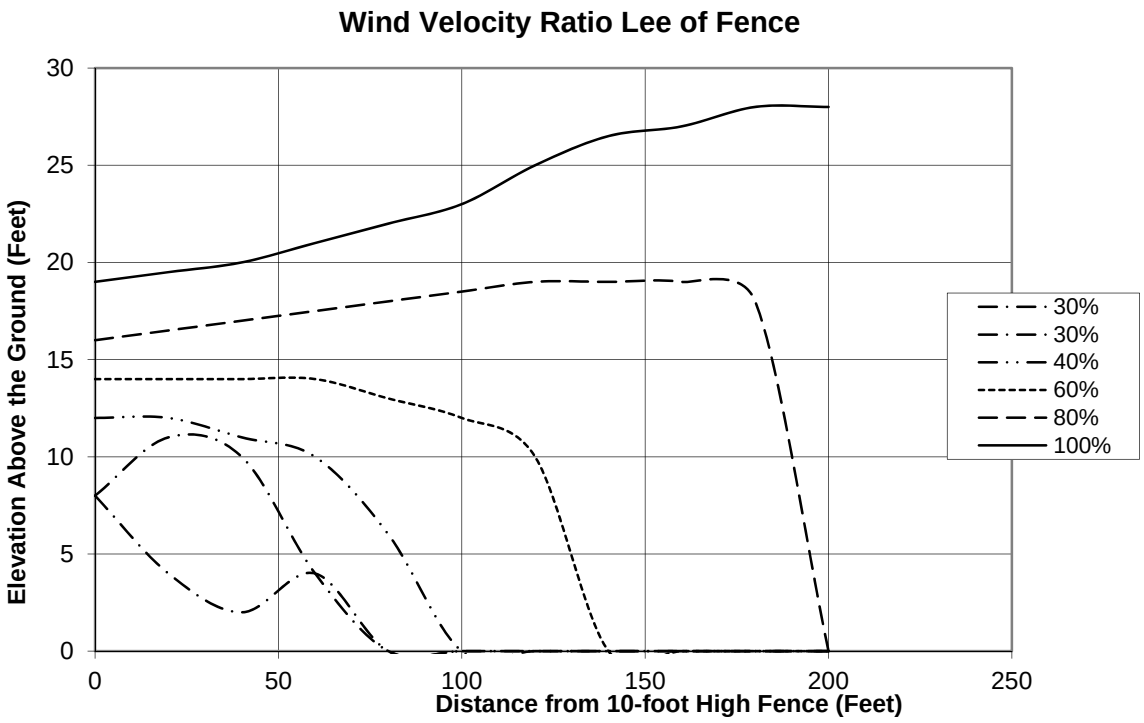
Therefore, this equation predicts that a wind speed of 16 ½ ft/sec at a height above the ground of 5 feet could produce a threshold wind velocity of 0.75 ft/sec at the ground surface and create a dust problem.

The wind fence will disrupt the flow of wind and create a zone for some distance behind it where the surface is not disturbed. How far this protected zone extends behind the wind fence depends upon the wind velocity.



The graph above was created from Table 7.4.[1]. Given our threshold wind speed of 18 km/hr, this graph suggests that for a distance of about 10, a 55 km/hr wind at 5 feet will not create dust from the surface. However, for smaller wind speeds, this distance is much farther. A 24 km/hr wind speed at a height of 5 feet, will not create dust from the surface for almost 200 feet behind the wind fence. Bear in mind that these wind speeds are at a height of only five feet, while the wind speeds reported by the National Weather Service at are a height of 10 meters and in general will be 1.3 times higher than at 5 feet.

As I stated in the introduction, dust can also be produced by earth moving activities on site. Although the primary method of controlling dust from these activities will be use water spray and mist, I have also analyzed the effect that the wind fence will have on potential dust sources in the vertical plane above the ground.



The graph above has been created from Figure 7.6[1] for our proposed 10-foot high fence. As shown on this graph, a front end loader placing excavated soil in the bed of a dump truck at a height of 10 feet, will experience only 30% of the wind speed within about 50 feet of the fence and will experience only about 50% of the wind speed at a distance of 100 feet from the fence. Therefore, the wind fence will not only act as a barrier to dust being generated from the bare surface of the ground, but will greatly reduce the probability of dust being generated from excavation as well.

APPENDIX C

INSPECTION FORMS

EXCLUSION ZONE FORM

Weekly Site Inspection Report No. _____

Week of: _____ Inspector: _____

Operable Unit 02 - Asarco Tacoma Smelter Site (Point Ruston)

INSPECTION AREA	OVERALL CONDITION			CLEAN?		NEED REPAIR?		COMMENTS/OBSERVATIONS
Exclusion Zones								
Area C - Phase II								
Fencing	G	F	P	Y	N	Y	N	
Wind Fencing	G	F	P	Y	N	Y	N	
Signs	G	F	P	Y	N	Y	N	
Dust Abatement	G	F	P	Y	N	Y	N	
Security	G	F	P	Y	N	Y	N	
Area D - Phase II								
Fencing	G	F	P	Y	N	Y	N	
Wind Fencing	G	F	P	Y	N	Y	N	
Signs	G	F	P	Y	N	Y	N	
Dust Abatement	G	F	P	Y	N	Y	N	
Security	G	F	P	Y	N	Y	N	
Area E - Phase II								
Fencing	G	F	P	Y	N	Y	N	
Wind Fencing	G	F	P	Y	N	Y	N	
Signs	G	F	P	Y	N	Y	N	
Dust Abatement	G	F	P	Y	N	Y	N	
Security	G	F	P	Y	N	Y	N	
Cooling Pond								
Fencing	G	F	P	Y	N	Y	N	
Signs	G	F	P	Y	N	Y	N	
Dust Abatement	G	F	P	Y	N	Y	N	
Security	G	F	P	Y	N	Y	N	
Phase I Work Site								
Fencing	G	F	P	Y	N	Y	N	
Wind Fencing	G	F	P	Y	N	Y	N	
Signs	G	F	P	Y	N	Y	N	
Dust Abatement	G	F	P	Y	N	Y	N	
Security	G	F	P	Y	N	Y	N	
Waterwalk Site								
Fencing	G	F	P	Y	N	Y	N	
Wind Fencing	G	F	P	Y	N	Y	N	
Signs	G	F	P	Y	N	Y	N	
Dust Abatement	G	F	P	Y	N	Y	N	
Security	G	F	P	Y	N	Y	N	

CONTAMINANT REDUCTION FORM

Weekly Site Inspection Report No. _____

Week of: _____ Inspector: _____

Operable Unit 02 - Asarco Tacoma Smelter Site (Point Ruston)

INSPECTION AREA	OVERALL CONDITION			CLEAN?		NEED REPAIR?		COMMENTS/OBSERVATIONS
CRZ								
Area C - Phase II								
Fencing	G	F	P	Y	N	Y	N	
Boot Wash	G	F	P	Y	N	Y	N	
Signs	G	F	P	Y	N	Y	N	
Wash Pad	G	F	P	Y	N	Y	N	
Tools	G	F	P	Y	N	Y	N	
Area D - Phase II								
Fencing	G	F	P	Y	N	Y	N	
Boot Wash	G	F	P	Y	N	Y	N	
Signs	G	F	P	Y	N	Y	N	
Wash Pad	G	F	P	Y	N	Y	N	
Tools	G	F	P	Y	N	Y	N	
Area E - Phase II								
Fencing	G	F	P	Y	N	Y	N	
Boot Wash	G	F	P	Y	N	Y	N	
Signs	G	F	P	Y	N	Y	N	
Wash Pad	G	F	P	Y	N	Y	N	
Tools	G	F	P	Y	N	Y	N	
Cooling Pond								
Fencing	G	F	P	Y	N	Y	N	
Boot Wash	G	F	P	Y	N	Y	N	
Signs	G	F	P	Y	N	Y	N	
Wash Pad	G	F	P	Y	N	Y	N	
Tools	G	F	P	Y	N	Y	N	
Phase I Work Site								
Fencing	G	F	P	Y	N	Y	N	
Boot Wash	G	F	P	Y	N	Y	N	
Signs	G	F	P	Y	N	Y	N	
Wash Pad	G	F	P	Y	N	Y	N	
Tools	G	F	P	Y	N	Y	N	
Waterwalk Site								
Fencing	G	F	P	Y	N	Y	N	
Boot Wash	G	F	P	Y	N	Y	N	
Signs	G	F	P	Y	N	Y	N	
Wash Pad	G	F	P	Y	N	Y	N	
Tools	G	F	P	Y	N	Y	N	

CLEAN ZONE FORM

Weekly Site Inspection Report No. _____

Week of: _____ Inspector: _____

Operable Unit 02 - Asarco Tacoma Smelter Site (Point Ruston)

INSPECTION AREA	OVERALL CONDITION			CLEAN?		NEED REPAIR?		COMMENTS/OBSERVATIONS
Clean Zones								
Phase I Work Site								
Fencing	G	F	P	Y	N	Y	N	
Gravel Cover	G	F	P	Y	N	Y	N	
Grading	G	F	P	Y	N	Y	N	
Drainage	G	F	P	Y	N	Y	N	
Housekeeping	G	F	P	Y	N	Y	N	
Haul Roads								
Fencing	G	F	P	Y	N	Y	N	
Gravel Cover	G	F	P	Y	N	Y	N	
Grading	G	F	P	Y	N	Y	N	
Drainage	G	F	P	Y	N	Y	N	
Housekeeping	G	F	P	Y	N	Y	N	
Phase II Work Site								
Fencing	G	F	P	Y	N	Y	N	
Gravel Cover	G	F	P	Y	N	Y	N	
Grading	G	F	P	Y	N	Y	N	
Drainage	G	F	P	Y	N	Y	N	
Housekeeping	G	F	P	Y	N	Y	N	
Waterwalk								
Fencing	G	F	P	Y	N	Y	N	
Gravel Cover	G	F	P	Y	N	Y	N	
Grading	G	F	P	Y	N	Y	N	
Drainage	G	F	P	Y	N	Y	N	
Housekeeping	G	F	P	Y	N	Y	N	
Fencing	G	F	P	Y	N	Y	N	
Gravel Cover	G	F	P	Y	N	Y	N	
Grading	G	F	P	Y	N	Y	N	
Drainage	G	F	P	Y	N	Y	N	
Housekeeping	G	F	P	Y	N	Y	N	
Fencing	G	F	P	Y	N	Y	N	
Gravel Cover	G	F	P	Y	N	Y	N	
Grading	G	F	P	Y	N	Y	N	
Drainage	G	F	P	Y	N	Y	N	
Housekeeping	G	F	P	Y	N	Y	N	

APPENDIX D

DUST SUPPRESSION EQUIPMENT

Appendix D - Dust Control

A Dust Control Plan identifies the fugitive dust sources at the construction site and describes all of the dust control measures to be implemented before, during, and after any dust generating activity for the duration of the project. The following dust control plan should be included in individual Construction Management Plans (CMP) for each phase of construction. This dust control plan will be kept on site by the contractor.

Dust Control Plan
Section 1 – General Information – Page 1

1-A Project Name and Location

Project Name: _____

Project Address: _____

Major X-Streets: _____

City: _____ County: _____

Section(s): _____ Township: _____ Range: _____

Expected Construction Start Date: End Date:

1-B Contacts

Report the names, addresses, and phone numbers of persons and owners or operators responsible for the preparation, submittal, and implementation of the Dust Control Plan and responsible for the dust generating operation and dust control applications.

Property Owner: _____

Address: _____

City / State / Zip: _____

Phone: Fax:

General Contractor: _____

Address: _____

City / State / Zip: _____

Contact Person: _____

Phone: Fax:

This Dust Control Plan was prepared by:

Name: _____

Title: _____

Company Name: _____

Address: _____

City / State / Zip: _____

Phone: Fax:

Section 1 – General Information – Page 2

Project Name: _____

1-C Contractors

Provide the names, addresses, and phone numbers of the contractors involved in dust generating activities **or** performing dust control as part of this project. A supplemental list may be attached.

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

1-D Who will have the primary responsibility for implementing this Dust Control Plan?

☐ **Property Owner** ☐ **Developer** ☐ **General / Prime Contractor**

☐ **Sub-Contractor(s)** ☐ **Other:** _____

Primary Project Contact: _____

Title: _____

Company Name: _____

Address: _____

City / State / Zip: _____

On-Site Phone: _____ Fax: _____

Mobile Phone: _____ Pager: _____

Dust Control Plan
Section 2 – Plot Plan – Page 1

Project Name: _____

2-A Plot Plan

A plot plan identifies the type and location of each project. Attach appropriately sized maps with the project boundaries outlined. Attached maps may include tract maps, site maps, and topographic maps. Use the checklist below to make sure all areas have been identified on the plot plan.

Identify the relative locations of actual and potential sources of fugitive dust emissions.

- ☐ Bulk material handling and storage areas.
- ☐ Paved and unpaved access roads, haul roads, traffic areas, and equipment storage yards.
- ☐ Contamination Reduction Zone exit points where carryout and trackout onto clean haul roads may occur.
- ☐ Water supply locations if water application will be used for controlling visible dust emissions.

Identify the relative locations of Occupied Zones and Air Monitors.

- ☐ Location of Air Monitors
- ☐ Occupied Zones
- ☐ No-work 50 foot Buffer around Occupied Zones.
- ☐ Other:

Dust Control Plan
Section 3 – Fugitive Sources – Page 1

Project Name: _____

3-A Disturbed Surface Area

Estimate the total area of land surface to be disturbed, the daily throughput volume of earthmoving in cubic yards, and the total area in acres of the entire project site.

Total area of land surface to be disturbed: _____ Acres

Daily maximum throughput volume of earthmoving: _____ Cubic Yards

Daily average throughput volume of earthmoving: _____ Cubic Yards

Total area of entire project site: _____ Acres

Total disturbed areas that will be left inactive for more than seven days: _____ Acres

3-B Dust Generating Activity Dates

The expected start and completion dates of **dust generating activities and soil disturbance activities** to be performed on site. For phased projects, it may be necessary to report expected start and completion dates separately.

Expected start date: _____ **Completion Date**: _____

Phase Project Start – A: _____ Completion – A: _____

Phase Project Start – B: _____ Completion – B: _____

Phase Project Start – C: _____ Completion – C: _____

3-C Other Locations

Identify whether any other locations should be included with this plan that are involved with this project. An example may include listing any site where materials will be imported from or exported to.

☐ No other locations are included with this project. (Skip to 3-D)

Location 1: _____

☐ No Dust Control Plan Required ☐ Included with this plan ☐ Included with another plan

Location 2: _____

☐ No Dust Control Plan Required ☐ Included with this plan ☐ Included with another plan

Location 3: _____

☐ No Dust Control Plan Required ☐ Included with this plan ☐ Included with another plan

Section 3 – Fugitive Sources – Page 2

Project Name: _____

3-D Sources of Fugitive Dust

This section describes the minimum requirements for limiting visible dust emissions from activities that cause fugitive dust emissions. **At least one box must be checked in each Section.**

Pre-Activity.

- ☐ The site will be pre-watered and work will be phased to reduce the amount of disturbed surface area at any one time (Complete Section 4-A).

Active Operations.

- ☐ Water will be applied to dry areas during leveling, grading, trenching, and earthmoving activities (Complete Section 4-A).
- ☐ Wind barriers will be constructed and maintained, and water or dust suppressants will be applied to the disturbed surface areas (Complete Sections 4-A or 4-B, and 4-C).

Inactive Operations, including after work hours, weekends, and holidays.

- ☐ Water or dust suppressants will be applied on disturbed surface areas to form a visible crust, and vehicle access will be restricted to maintain the visible crust. (Complete Section 4-A or 4-B, and 4-C)

Temporary stabilization of areas that remain unused for seven or more days.

- ☐ Vehicular access will be restricted and water or dust suppressants will be applied and maintained at all un-vegetated areas (Complete Section 4-A or 4-B, and 4-C).
- ☐ Gravel will be applied and maintained at all previously disturbed areas (Complete Section 4-C).
- ☐ Dust Suppressant will be applied and maintained (Complete Section 4-B).
- ☐ Previously disturbed areas will be paved (Complete Section 4-C).

Unpaved Access and Haul Roads, Traffic and Equipment Storage Areas.

- ☐ Apply water or dust suppressants to unpaved haul and access roads (Complete Section 4-A or 4-B)
- ☐ Post speed limit signs of not more than 15 miles per hour at each entrance, and again every 500 feet. (Complete Section 4-C)
- ☐ Water or dust suppressants will be applied to vehicle traffic and equipment storage areas (Complete Section 4-A or 4-B).

Wind Events.

- ☐ Water application equipment will apply water to control fugitive dust during wind events, unless unsafe to do so. Outdoor construction activities that disturb the soil will cease whenever visible dust emissions cannot be effectively controlled.

Section 3 – Fugitive Sources – Page 3

3-E Bulk Materials

Outdoor Handling of Waste Materials.

- ☐ Water or dust suppressants will be applied when handling waste materials.
- ☐ Wind barriers with less than 50 percent porosity will be installed and maintained, and water or dust suppressants will be applied.

Outdoor Storage of Waste Materials.

- ☐ No Waste materials will be stored during this project.
- ☐ Water or dust suppressants will be applied to storage piles.
- ☐ Storage piles will be covered with tarps, plastic, or other suitable material and anchored in such a manner that prevents the cover from being removed by wind action.
- ☐ Wind barriers with less than 50 percent porosity will be installed and maintained around the storage piles, and water or dust suppressants will be applied.
- ☐ A three-sided structure (< 50% porosity) will be used that is at least as high as the storage piles.

On-Site Transporting of Waste Materials.

- ☐ No Waste materials will be transported on the project site.
- ☐ Vehicle speed will be limited on the work site.
- ☐ All haul trucks will be loaded such that the freeboard is not less than six inches when transported across any clean haul road.
- ☐ A sufficient amount of water will be applied to the top of the load to limit visible dust emissions.
- ☐ Haul trucks will be covered with a tarp or other suitable cover.

Off-Site Transporting of Waste Materials.

- ☐ No waste materials will be transported to or from the project site.
- ☐ The following practices will be performed:
  - The interior of emptied truck cargo compartments will be cleaned or covered before leaving the site.
  - Spillage or loss of bulk materials from holes or other openings in the cargo compartment's floor, sides, and tailgates will be prevented.
  - Haul trucks will be covered with a tarp or other suitable cover or will be loaded such that the freeboard is not less than six inches when transported on any paved public access road to or from the project site and a sufficient amount of water will be applied to the top of the load to limit visible dust emissions.

3-F Comments

Dust Control Plan
Section 4 – Dust Control Methods – Page 1

Project Name:

4-A Water Application

Complete this section if water application will be used as a control method for limiting visible dust emissions and stabilizing surface areas. Check and answer everything that applies to this project.

Water Application Equipment:

☐ Sprinklers: Describe the activities that will utilize sprinklers:

_____

Minimum treated area: _____ ☐ Square Feet ☐ Acres

Maximum treated area: _____ ☐ Square Feet ☐ Acres

Minimum water flow rate: _____ Gallons/minute Duration: _____

☐ Water Truck, ☐ Water Trailer, ☐ Water Wagon, ☐ Other: _____

Describe the activities that will utilize this equipment:

_____

Number of application equipment available: _____

Application equipment capacity: _____

Application frequency: _____

Application rate: _____ Gallons per acre per application

Hours of operation: _____

Water application equipment is available to operate after normal working hours, on weekends, and holidays.

After-hours contact: _____ Phone No.: _____

After-hours contact: Phone No.:

Water Supply: *Include the relative locations of these sources on the plot plan.*

☐ Fire hydrants

Number of hydrants available On-Site: _____ Off-Site: _____

Approval granted by the owner or public agency to use their fire hydrants for this project.

Owner or Agency: _____

Contact: _____ Phone No.: _____

☐ Storage tanks Number and capacity: _____

☐ Wells Number and flow rate: _____

☐ Canal, River, Pond, Lake, etc. Describe: _____

Approval granted by the owner or public agency to use their water source for this project.

Owner or Agency: _____

Contact: _____ Phone No.: _____

☐ Other: _____

Section 4 – Dust Control Methods – Page 2

Project Name: _____

4-B Dust Suppressant Products

Complete this section if a dust suppressant product will be used. These materials include, but are not limited to: hygroscopic suppressants (road salts), adhesives, and polymer emulsions.

Copy this page if more than one dust suppressant product will be used.

☐ **Not Applicable.** Only water application will be the control method used. **Skip to 4-C.**

Application Area: _____

Product Name: _____

Contractor's Name: _____ Phone No: _____

Application Rate: _____ Gallons of undiluted material per ☐ mile or ☐ acre treated.

Application Frequency: _____ Applications per ☐ week, ☐ month, ☐ year

Application Equipment: _____

Number of Application Equipment Available: _____

Application Equipment Capacity: _____

Attach each of the following information that fully describes this product. Use the checklist below to make sure all information is submitted with this plan.

- ☐ Product Specifications (MSDS, Product Safety Data Sheet, etc.)
- ☐ Manufacturer's Usage Instructions (method, frequency, and intensity of application)
- ☐ Environmental impacts and approvals or certifications related to the appropriate and safe use for ground application.

Section 4 – Dust Control Methods – Page 3

Project Name: _____

4-C Other Dust Control Methods

Check below the other types of dust control methods that will be employed at the construction site.

☐ Physical barriers for restricting unauthorized vehicle access:
- ☐ Fences ☐ Gates ☐ Posts ☐ Berms ☐ Concrete Barriers
- ☐ Other: _____

☐ Wind barriers Describe: _____

☐ Posted speed limit signs:
- ☐ Posted at 15 miles per hour, ☐ Posted at _____ miles per hour (less than 15 MPH)

☐ Re-establish vegetation for temporarily stabilizing previously disturbed surfaces.
- Explain: _____

☐ Apply and maintain gravel:
- ☐ On haul roads ☐ On access roads ☐ At equipment storage yards
- ☐ At vehicle traffic areas ☐ For temporarily stabilizing previously disturbed areas.
- Explain: _____

☐ Apply pavement:
- Explain: _____

☐ Other: _____

4-D Contingencies

Contingencies to be implemented if application equipment becomes inoperable, more equipment is needed to effectively control fugitive dust emissions during active and inactive periods, accessibility limitations occur at the water sources, or staff is not available to operate the application equipment. Describe the contingencies that will be in place and when they will be implemented. Attach any additional information if needed.

SUPPLEMENTAL INFORMATION ON DUST SUPPRESSION EQUIPMENT

Rain Bird Equipment or Equal:

RAIN GUN ADVANTAGES:

- Large trajectory (angle of spray) for use on large sloping stockpiles.
- Height of water stream can reach 79 feet (23,7 meters).
- Radius of throw can reach 182 feet (55,4 meters).
- Durable aluminum, stainless steel and bronze construction.
- Available for International markets specifically for mining and industrial applications.

IMPACT SPRINKLER ADVANTAGES:

- Riser-mounted for use on large sloping stockpiles.
- Rugged brass, bronze, and stainless steel construction.
- Straight-through flow for superior performance in dirty water.

ROTOR ADVANTAGES:

- Stainless steel risers may be used for added durability.
- Pop-up rotors have a low profile, which make them ideal to use in areas with foot and machine traffic.
- Radius of throw can reach up to 80 feet (24,7 meters).*

PROPER WATER DISTRIBUTION COMPONENTS CONTROL DUST

Rain Bird Rain Guns, impact sprinklers and pop-up rotors may be used to wet stockpiles, roadways, and bare surfaces. Rain Guns are used to wet stockpiles because of the trajectory (or angle of the spray) and radius of throw. The height of the water stream can reach 79 feet (23.7 meters). The throw radius can reach a maximum of 182 feet (55.4 meters). All of these features make Rain Guns ideal for this application. In addition, brass impact sprinklers may be used in combination with the Rain Guns to provide adequate coverage for the sloped stockpiles. The impact sprinklers are riser-mounted, lifting them off the ground. The impact sprinklers have a maximum throw radius of 51 feet (15.6 meters).

Along roadways and on bare soil surfaces, Rain Bird pop-up rotors may be installed. These rotors maybe used in areas with foot and machine traffic, where riser-mounted impact sprinklers are not suitable. The rotors may be installed with stainless steel risers if additional durability is desired. The stainless steel adds an extra layer of strength to guard against damage from side impact.

Dust Boss Equipment or Equal:

During excavation of high concentration waste soils, compliance with the EPA's air quality standards will require a dust suppression option that provides both surface wetting and airborne particle control, while avoiding oversaturation.

Dust Boss manufactures highly-efficient dust control systems that can cover large areas with an oscillating ducted fan design, able to cover nearly half an acre with a powerful mist of water droplets atomized to the optimum size for dust suppression. These devices are capable of creating a dust barrier "curtain" that will drastically reduce any potential for airborne particle migration into the local community and confine dust to the immediate area.

Gorilla Snot

Gorilla-Snot® is a polymer-based emulsion used primarily to stabilize all soils from dust and erosion. It is specifically engineered for ease of use for large commercial projects down to smaller applications. It can be as simple to apply as watering the ground. Furthermore, Gorilla-Snot® is designed to work its way down into the soil to maximize the penetration depth. The result is a thicker protective barrier with a more rigid and stable base. Once cured, Gorilla-Snot® becomes completely transparent, leaving the natural landscape to appear untouched. Gorilla-Snot® results are based on the application rate used. Modest applications can create a light temporary surface crust that is permeable by water and is useful for dust control needs. On the other hand, heavy applications can generate results similar to the qualities of cement. Most importantly, Gorilla-Snot® is a truly biodegradable product that is completely environmentally safe to use. The manufacturers' literature for Gorilla Snot® soil tackifier is provided below.

Rhino Snot

Envirotac II, affectionately called Rhinosnot, is a water soluble, vinyl acetate-acrylic copolymer. Envirotac II is a high performance, environmentally-safe, low cost acrylic copolymer. When applied to soils or sands, it will penetrate and coat the surface. Upon

drying, Envirotac forms a water-proof, UV-resistant, solid bond which binds the soil particles. Increasing the concentration of Envirotac II, can create highly durable surface that will be pliable and hard enough to minimize surface damage and withstand heavy traffic. Envirotac II is a proprietary blend of polymers that use proven long-chain nano-technology to form complex bonds at the microscopic level between aggregates. The manufacturers' literature for Envirotac II (Rhino Snot) soil tackifier is provided below.

ENVIROTAC II
Soil Stabilizer

The standard by which all others are measured

Envirotac II is a non-hazardous, environmentally friendly acrylic-based co-polymer soil stabilizer and dust control solution that binds the soil matrix to create a layer stronger than cement-based stabilizers at a fraction of the price.

Envirotac II can be used for sub-base stabilization and wear course applications for roads, highways, and airfield surfaces.

Envirotac II is used by more Governments, Militaries, and Fortune 500 companies than any other stabilization product.
Envirotac II Soil Stabilizer is a performance and cost-effective alternative to traditional cement and lime based stabilizer.

Envirotac II is applied in liquid form to penetrate into void spaces and maximize surface binding. Homogenous blending ensures equal curing and minimal shrinkage.

Envirotac II is suitable for mixed-in-situ stabilization of soils that other stabilizers cannot touch.

Envirotac II can bind different locally available materials such as re-claimed asphalt, fly ash, and in situ aggregate to make wear courses suitable for heavy traffic and aircraft landing strips.

Envirotac II has compressive strengths almost double that of cement and lime based stabilizers (10%) in fine-grained soils.

Envirotac II works in high saline environments, fine and silty aggregates, acidic and alkaline ph, and soils with high organic content.

Envirotac II is environmentally safe with no risk to sensitive eco-systems or workers.

Envirotac II comes as a concentrate that is diluted by fresh and seawater (up to 4% salinity) to achieve consistent compressive strength requirements. Seawater concentration mixes are increased by a factor of 1.5 compared to fresh water.

Envirotac II is resistance to heat, water, and UV. Parking and road surfaces last longer than asphalt pavements with no significant maintenance required if properly applied.

Envirotac II cures to a transparent finish or can be dyed black with environmentally safe dyes to resemble asphalt pavement.

Envirotac II is easy to apply with simple equipment and cures within 24 hours.

APPLICATION	WATER MIX	
	FRESH WATER	SALT WATER
Wear Course (Heavy Traffic)	4	2
Wear Course (Heavy Traffic)	5	3
Sub-base Stabilizer	5	3
Dust Control	8	6

Environmental Products & Applications, Inc
78-900 Avenue 47, Suite 109
La Quinta CA 92253 USA

Tel: +1 909 908 3052
Web: www.envirotac.com
Email: info@envirotac.com

Soilworks, LLC®
2450 S Gilbert Road, Suite 210, Chandler, AZ 85286-1595 USA
T: 800-545-5420 O: 480-545-5454 F: 480-545-5456
www.Soilworks.com Info@Soilworks.com
Specializing in Soil Stabilization & Dust Control

Global Manufacturer & Distributor of
Soiltac® / Powdered Soiltac®
Durasoil® AND Gorilla Snot®

GORILLA-SNOT®

Topical Traffic Area Application Overview

1.) Prepare the Site

Dry Soil: The site should be completely dry and free from water.
Weather: The site must be free from rain for a minimum of 72 hours after the application.
Temperature must be at least 40°F (4°C).
Compaction: Compact the site to a minimum of 95%.
(per ASTM D 698 D 1557 modified Proctor Density).
Drainage: Contour and crown the site to provide for proper drainage.
Loose Aggregate: Remove any loose aggregate, soil or debris from the treatment area.

2.) Prepare Application Equipment

Spray Nozzles: Set spray nozzles to the desired width, height and output rate.
Test equipment (off-site) if necessary.
Coverage: The spray nozzles should provide an even coat over the treatment area with each pass.
Spray Rate: Set the spray rate high enough to allow even coverage with multiple coats and low enough to prevent material from draining away from the treatment area.
Pre-Wetting (Optional): Optimally, pre-wet the treatment area with water (only) to break the surface tension and increase penetration depth. Pre-wet at a rate of 100 SF/gallon (2.5m²/liter) of water.
Release Agent (Optional): Optionally, a form release agent (like Durasoil®) can be sprayed onto the equipment to prevent Gorilla-Snot® overspray from adhering onto the outside of the equipment

3.) Prepare the Gorilla-Snot® Dilution

Water: Fill the application equipment with the recommended volume of water.
Reference the "application coverage rates" chart.

> **Example**: Roads (Light Traffic) = 32 ft²/gallons (0.8m²/liter) +7 parts water.
> **Equipment:** 4,000 gallon (15,142 liters) water truck
> **Calculation**: 7+1 = 8 parts dilution total.
> 4,000 gallons / 8 parts = 500 gallons (1,893 liters) per part
> Volume of Water: 500 gallons X 7 parts = 3,500 gallons (13,249 liters) of water
> Volume of Gorilla-Snot®: 500 gallons X 1 part = 500 gallons (1,893 liters) of concentrate
> Volume of Dilution: 500 gallons X 8 parts = 4,000 gallons (15,142 liters) of dilution

Gorilla-Snot®: Fill the application equipment with the recommended volume of Gorilla-Snot® concentrate
Foaming: To prevent foaming, add the Gorilla-Snot® concentrate last, directly into the water.

4.) Apply the Gorilla-Snot® Dilution

Multiple Coats: Apply the Gorilla-Snot® dilution in coats over the treatment area.

> **Example**: (See Above) Roads (Light Traffic) typically require a minimum of 4 even coats.
> 500 gallons / 4 coats = 125 gallons (473 liters) (Gorilla-Snot® concentrate) per coat.
> 4,000 gallons / 4 coats = 1,000 gallons (3,785 liters) (Gorilla-Snot® dilution) per coat.
> 500 gallons (Gorilla-Snot® concentrate) X 32 ft²/gal. = 16,000 ft² (1,487 m²) treatment per truck

Drying: Each successive coat of Gorilla-Snot® dilution should be applied in a timely manner to ensure that the surface always stays wet with the Gorilla-Snot® dilution. DO NOT allow the Gorilla-Snot® dilution to dry between the application coats. Failure to do so will result in an underperforming "skin" layer rather than a penetrating layer.

5.) Clean the Application Equipment

Rinse: Rinse off all application equipment thoroughly with water until clean. If Gorilla-Snot® is allowed to dry and cure use a hot pressure washer or steam cleaner and brush to remove residue.
Traffic: Prevent any human activity over the treated area until the site has completely cured.
Curing: Allow the treated area to dry and cure for approximately 24 hours (@70°F/21°C).

Soilworks, LLC®
2450 S Gilbert Road, Suite 210, Chandler, AZ 85286-1595 USA
T: 800-545-5420 O: 480-545-5454 F: 480-545-5456
www.Soilworks.com Info@Soilworks.com
Specializing in Soil Stabilization & Dust Control

Global Manufacturer & Distributor of
Soiltac® / Powdered Soiltac®
Durasoil® AND Gorilla Snot®

GORILLA-SNOT®

Letter of Introduction

Soilworks®, LLC is the innovator and manufacturer of **Gorilla-Snot®** soil stabilizer and dust control agent. It is the *economy grade version of* Soilworks'® *Soiltac®* soil stabilizer. Gorilla-Snot® is an eco-safe, biodegradable, liquid copolymer used to stabilize and solidify any soil or aggregate as well as erosion control and dust suppression.

Soilworks'® recent advances in simulation, chemistry, processing techniques, and analytical instrumentation have allowed a whole host of new types of polymer particles and polymer nanotechnology applications to be realized. These advances led to the revolutionary development of nanotechnology into Gorilla-Snot's® superior performance.

Once applied to the soil or aggregate, the copolymer molecules coalesce forming bonds between the soil or aggregate particles. The key advantage of Gorilla-Snot® originates with its long, nanoparticle molecular structure that link and cross-link together. As the water dissipates from the soil or aggregate, a durable and water resistant matrix of flexible solid-mass is created. Once cured, Gorilla-Snot® becomes completely transparent, leaving the natural landscape to appear untouched.

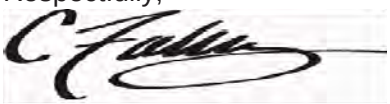
Gorilla-Snot® results are based on the application rate used. Modest application rates are useful for dust suppression and erosion control by creating a three-dimensional cap or surface crust. Heavier rates can generate qualities similar to cement. By adjusting the application rate, Gorilla-Snot® can remain effective from weeks to several years. Most importantly, Gorilla-Snot® is a biodegradable product that is completely environmentally safe to use.

Soilworks'® products have been rigorously evaluated and their performance verified by the U.S. Army Engineering Research and Development Center (ERDC) against the industry's traditional top performing soil stabilizers and dust control agents. As a result, the Department of Defense continues to award Soilworks® with contracts to supply on-going efforts with Gorilla-Snot®. Its success with the U.S Military and Allied Forces has led to Soilworks® GSA contract (# GS-07F-5364P) and a complete listing of National Stock Numbers for the U.S. Department of Defense warehouses.

Gorilla-Snot's® advanced nanotechnology is modernizing the way we stabilize soils and aggregates in addition to controlling dust and erosion for a whole new generation. Gorilla-Snot® applications are extensive ranging from simple backyard trails and construction sites to heavy-lift military cargo runways.

Soilworks® is dedicated to economically solving soil stabilization challenges throughout the world's residential, commercial, industrial and military markets. For more information about Gorilla-Snot®, please visit us online at www.soilworks.com or call 1-800-545-5420.

Respectfully,



Chad Falkenberg
President

Soilworks, LLC®
2450 S Gilbert Road, Suite 210, Chandler, AZ 85286-1595 USA
T: 800-545-5420 O: 480-545-5454 F: 480-545-5456
www.Soilworks.com Info@Soilworks.com
Specializing in Soil Stabilization & Dust Control

Global Manufacturer & Distributor of
Soiltac® / Powdered Soiltac®
Durasoil® AND Gorilla Snot®

GORILLA-SNOT®

Topical Non-Traffic & Slope Area Application Overview

1.) Prepare the Site

Dry Soil: The site should be completely dry free from water.
Weather: The site must be free from rain for a minimum of 72 hours after the application. Temperature must be at least 40°F (4°C).
Compaction (Optional): Compaction is not required but is recommended for optimal longevity. A minimum of 95% density is recommended (per ASTM D 698 D 1557 modified Proctor Density).
Drainage: Optimally, contour the site to provide for proper drainage to prevent channeled water flow.

2.) Prepare Application Equipment

Spray Nozzles: Set spray nozzles to the desired width, height and output rate. Test equipment (off-site) if necessary.
Coverage: The spray nozzles should provide an even coat over the treatment area with each pass.
Spray Rate: Set the spray rate high enough to allow even coverage with multiple coats and low enough to prevent material from draining away from the treatment area.
Pre-Wetting (Optional): Optimally, pre-wet the treatment area with water (only) to break the surface tension and increase penetration depth. Pre-wet at a rate of 100 SF/gallon (2.5m²/liter) of water.
Release Agent (Optional): Optionally, a form release agent (like Durasoil®) can be sprayed onto the equipment to prevent Gorilla-Snot® overspray from adhering onto the outside of the equipment

3.) Prepare the Gorilla-Snot® Dilution

Water: Fill the application equipment with the recommended volume of water.
Reference the "application coverage rates" chart.

> **Example**: 6 Month Dust Control (no traffic)=138 gal./acre=316 ft²/gal.)(8 m²/liter) + 13 parts water
> **Equipment:** 4,000 gallon (15,142 liters) water truck
> **Calculation**: 13+1 = 14 parts dilution total.
> 4,000 gallons / 14 parts = 286 gallons (1,082 liters) per part
> Volume of Water: 286 gallons X 13 parts = 3,714 gallons (14,060 liters) of water
> Volume of Gorilla-Snot®: 286 gallons X 1 part = 286 gallons (1,082 liters) of concentrate
> Volume of Dilution: 286 gallons X 14 parts = 4,000 gallons (15,142 liters) of Gorilla-Snot® dilution

Gorilla-Snot: Fill the application equipment with the recommended volume of Gorilla-Snot® concentrate.
Foaming: To prevent foaming, add the Gorilla-Snot® concentrate last, directly into the water.

4.) Apply the Gorilla-Snot® Dilution

Multiple Coats: Apply the Gorilla-Snot® dilution in coats over the treatment area. On slopes, the steeper the slope, the need for more coats (to prevent run-off and increase penetration depth).

> **Example**: (See Above) 6 Month Dust Control Rate (no traffic) typically requires 1-2 Coats
> 286 gallons / 2 coats = 125 gallons (473 liters) (Gorilla-Snot® concentrate) per coat.
> 4,000 gallons / 2 coats = 2,000 gallons (7,571 liters) (Gorilla-Snot® dilution) per coat.
> 286 gallons (Gorilla-Snot® concentrate) / 138 gal./acre = 2 acres (8,378 m²) treatment per truck

Drying: On slopes, each successive coat of Gorilla-Snot® dilution should be applied in a timely manner to ensure that the surface always stays wet with the Gorilla-Snot® dilution. On slopes, DO NOT allow the Gorilla-Snot® dilution to dry in between the application coats. Failure to do so will result in an underperforming "skin" layer rather than a penetrating layer.

5.) Clean the Application Equipment

Rinse: Rinse off all application equipment thoroughly with water until clean. If Gorilla-Snot® is allowed to dry and cure, use a pressure washer or steam cleaner and a brush to remove residue.
Traffic: Prevent any human activity over the treated area.
Curing: Allow the treated area to dry and cure for approximately 24 hours (@70°F/21°C).

APPENDIX E

EMERGENCY RESPONSE PLAN

Ready Business®

Emergency Response Plan

Company Name

Address

Telephone

Contact Name Title

Last Revision Date

Policy and Organizational Statements

Identify the goals and objectives for the emergency response plan.

Define what your emergency response team is expected to do during an emergency (e.g., evacuate employees and visitors, provide first aid, etc.)

Identify any regulations covered by your plan (e.g., OSHA, fire code, etc.)

Evacuation Plan

Evacuation may be required if there is a fire in the building or other hazard. The evacuation team will direct the evacuation of the building and account for all employees outside at a safe location.

Employees will be warned to evacuate the building using the following system:	
Employees should assemble at the following location for accounting by the evacuation team:	

(Post a map showing the location(s) in a conspicuous location for all employees to see.)

Person who will bring the employee roster and visitor log to the evacuation assembly area to account for all evacuees. The evacuation team leader will be informed if anyone is missing or injured.	

Evacuation Team	Name / Location
Evacuation Team Leader	
Floor Wardens (one for each floor)	
Searchers (one per floor)	
Stairwell and Elevator Monitors	
Aides for Persons with Disabilities	
Assembly Area Monitors (account for evacuees at the assembly area and inform incident commander if anyone is missing or injured)	

Severe Weather/Tornado Sheltering Plan

If a tornado warning is issued, broadcast a warning throughout all buildings instructing everyone to move to shelter.

Shelter-In-Place Team Assignments	Name / Location
Team Leader	
Person to monitor weather sources for updated emergency instructions and broadcast warning if issued by weather services	
Persons to direct personnel outside to enter the building	
Persons to direct employees to designated tornado shelter(s)	

Tornado Warning System & Tornado Shelter Locations

Location of tornado warning system controls	
Location of tornado shelters	

Shelter-In-Place Plan

If warned to "shelter-in-place" from an outside airborne hazard, a warning shoudl be broadcast and all employees should move to shelter.

Shelter-In-Place Team Assignments	Name / Location
Team Leader	
Direct personnel outside to enter the building; then close exterior doors	
Shutdown ventilation system and close air intakes	
Move employees to interior spaces above the first floor (if possible)	
Person to monitor news sources for updated emergency instructions	
Assembly Area Monitors (to account for evacuees at the assembly area)	

Shelter-In-Place Shutdown of Ventilation System

Location of controls to shutdown ventilation system:	
Location of air handling units, fan rooms, or air intakes:	

Lockdown Plan

Persons trained to use the warning system to warn persons to "lockdown"

Name	Location

Instructions for Broadcasting Warnings

Where to Access the Warning System
(e.g., telephone, public address system, etc.)

Instructions for using the system

Appendices

Emergency Response Teams

Identify the members of emergency response teams not identified elsewhere.

- Facilities or building management staff familiar with building utility and protection systems and those who may assist with property conservation activities.
- Security
- Others trained to use fire extinguishers, clean up small spills of hazardous materials.

Team	Member Name	Location	Work Telephone	Home/Cell Telephone

Public Emergency Services & Contractors

Emergency Service	Name	Emergency Telephone	Business Telephone
Fire Department			
Emergency Medical Services			
Police Department			
Emergency Management Agency			
Hospital			
Public Health Department			
State Environmental Authority			
National Response Center (EPA)			
Electrician			
Plumber			
Fire Protection Contractor			
Elevator Service			
Hazardous Materials Cleanup			
Cleanup / Disaster Restoration			

Warning, Notification & Communications Systems

The following systems are used to warn employees to take protective action (e.g., evacuate, move to tornado shelter, shelter-in-place, or lockdown) and provide them with information. The Communications capabilities enable members of our emergency team to communicate with each other and others.

Warning System	Fire Alarm	
	Public Address	
	Other (describe)	
Notification System	Electronic	
	Telephone call tree	
Communications Capabilities	Telephone	
	Two-way radio	

Fire Protection Systems

Document the fire protection systems including the types of systems, location, area, or hazard protected, and instructions.

System Type	Location	Access Point / Instructions
Sprinkler System	Control Valve	
	Control Valve	
	Control Valve	
Fire Pump		
Special Extinguishing Systems	Computer Room	
	Kitchen	
	Manufacturing Area	

Revision History

Revision No.	Date	Description of Changes	Authorization

Plan Distribution & Access

The Plan will be distributed to members of the emergency response team and department heads. A master copy of the document should be maintained by the emergency response team leader. The plan will be available for review by all employees.

Provide print copies of this plan within the room designated as the emergency operations center (EOC). Multiple copies should be stored within the facility EOC to ensure that team members can quickly review roles, responsibilities, tasks, and reference information when the team is activated.

An electronic copy of this Plan should be stored on a secure and accessible website that would allow team member access if company servers are down.

Electronic copies should also be stored on a secured USB flash drive for printing on demand.